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**The Consequences of Authentic Leadership and
Psychological Capital: A Unit level, Multi-rater,
Intervention and Longitudinal Study**

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Doctor of Philosophy

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University of Durham

December 2013

Abstract

Drawing on managerial theories (e.g. social learning theory, emotion contagion and broaden-and-build theory, conservation of resource theory, goal setting theory, and social exchange theory), this study proposes a comprehensive model that links authentic leadership to organizational citizenship behaviour by means of key mediating variables (i.e. role modeling, psychological capital, and work competence). Further, underpinned by the nature of psychological capital (PsyCap), which is state-like and open to development, this study proposes that authentic leaders' PsyCap can be enhanced by PsyCap intervention, which in turn amplifies the transmission effect on the consequences of authentic leadership.

This study examines these propositions not only at individual but also at team level. Survey questionnaires have been conducted with multisource in 2 rounds in 3 manufacturing in China, including a sequential of activities including one pilot survey, 1st round survey (N=774 individuals; N=89 teams), PsyCap intervention training (N=39 leaders in the treatment group, N=48 leaders in the control group), and 2nd round survey (N=620 individuals; N=87 teams). This study is an experimental research using randomized controlled trials (RCT) to divide the control group and the treatment group who received the PsyCap intervention.

Several procedural techniques (e.g. incentive, protecting respondents' identification, blinding the treatment group) have been incorporated in order to increase response rate and reduce the risk of common method bias. This study is a longitudinal research included a complete panel design, making the possibility to reveal causality among the studied variables. These features build up its very high methodological quality of longitudinal research.

This study tests the propositions with powerful statistical techniques. Firstly, this study uses confirmatory factor analyses (CFA) to identify the best measurement model. Secondly, this study uses structure equation modeling (SEM) to test causal hypothesised models. Finally, Using SEM a 2-step group analysis has been conducted to test for the equivalence of causal structure between the treatment group and control group. The result indicates significant different effects in the causal paths in the structure models at both individual and team level. This provides strong support of the effects of PsyCap intervention.

The results from SEM reveal some substantial new findings. Key findings are that, authentic leadership does not directly predict employees' PsyCap, but transmits its effect through role modeling. Employees' PsyCap does not contribute to OCB, but transmits its main effects through work competence. These findings are more in-depth than corresponding prior studies. Another new finding is that training leaders' PsyCap has effects on their role modelling, which in turn influence employees' PsyCap, work competence and OCB. This finding makes its contribution unique and significant, as it is the first PsyCap intervention study examining the transmitting effect from team leader to team members. It is also the 1st study to examine developmental character of PsyCap as well as its behaviour impacts from PsyCap intervention in Chinese context.

The findings are discussed with respect to earlier findings. Suggestions for future research are proposed.

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List of abbreviations

PsyCap	Psychological capital
PCI	Psychological capital intervention
NPCI	Without Psychological capital intervention
OCB	Organisational citizenship behaviour
SLT	Social learning theory
BB	Broaden – and – build
COR	Conservation of resource
SET	Social exchange theory
AL	Authentic leadership measured at Time 1
XAL	Authentic leadership measured at Time 2
XRM	Role modelling measured at Time 2
XPsyCap	Psychological capital measured at Time 2
XCP	Work competence measured at Time 2
XLCP	Work competence measured at Time 2 (rated by line manager)
XOCB	Organizational citizenship measured at Time 2
CFA	Confirmatory factor analysis
SEM	Structural equation modeling

Note: AL, XAL, XRM, and XPsyCap, were measured by production workers; XCP and XOCB, were measured by supervisors; XLCP was measured by line manager.

Statement of copyright

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Chapter 1 : Introduction

Introduce the importance of the study, the objectives, potential contributions, and outline.

1.1 The importance of the study

It has been acknowledged that people are valuable resources for gaining competitive advantage. In today's highly turbulent economic environment, in order to survive and prosper, it is particularly important for organisations to find effective and efficient approaches to develop strengths in their employees. Psychological capital (PsyCap) is a fairly new concept which is regarded as a complementary resource to human and social capital concerning competitive advantage. Besides, in work places, authentic leadership, an important resource forming competitive advantage of organisations, plays a critical role in enabling and supporting employees. This study would adopt this philosophy to examine resources such as Psycap and authentic leadership.

1.1.1 Sustainable competitive advantage for organizational success

Competitive advantages are vital for the organizational success, and it attracts abundant researches. The resource-based view (RBV) is a major body of thought concerned with explaining sources of competitive advantage. RBV focus on the ways in which firms might generate and defend unique resources of high performance. RBV theorists propose that an organisation develops competitive advantage by acquiring, developing, combining, and deploying its desirable resources (Barney, 1991; Barney and Clark 2007). RBV theory has had great impacts on human resource practice (Barney and Clark 2007; Nyberg, Moliterno, Hale, and Lepak, 2014; Shaw, Park, and Kim, 2013; Wright, Dunford, and Snell, 2001). In spite of different foci, in general, authors agree that an organisation's resources form the basis of competitive advantage, leading to increased performance, which determines organisational

success (Barney, 1991; Barney and Clark 2007; Kozlenkova, Samaha, and Palmatier, 2014; Newbert, 2008; Shaw et al., 2013; Wernerfelt, 1984, 1995; Wright et al., 2001). These resources can be used to implement value-creating strategies for an organisation to gain a competitive advantage (Barney, 1991; Barney and Clark 2007; Kozlenkova et al., 2014; Wernerfelt, 1984, 1995; Wright et al., 2001). These resources are regarded as consisting of traditional economic/financial capital; human capital (e.g. knowledge, skills, abilities) (Luthans, Luthans, and Luthans, 2004; Nyberg et al., 2014; Wright, McMahan, and McWilliams, 1994; Wright et al., 2001); social capital (e.g. networks, relationships, trust, norms, and rules of behaviour) (Adler and Kwon, 2002; Luthans et al., 2004; Luthans and Youssef, 2004); positive leadership (e.g. authentic leadership) (Luthans and Avolio, 2009; Norburn and Birley, 1988; Thomas, 1988); and positive behaviours (e.g. organisational citizenship behaviour) (Luthans and Youssef, 2007a; Luthans and Avolio, 2009; Wright et al., 2001).

Nonetheless, for the competitive advantage to be sustainable, a desirable resource had to meet four criteria: value, rarity, inimitability and non-substitutability (Barney 1991; Wright et al., 1994; Wright et al., 2001; Newbert 2008). According to Barney (1991) and Barney and Clark (2007), value is defined as worth resources competitively and not easy to obtain; rarity means that the resource is not currently available to a large number of organisations' competitors; Inimitability means the resource is very difficult for other organisations to copy or reproduce for their own use; Non-substitutability refers to the resource is very hard to neutralise with other resources which will meet the same ends. Besides the original four criteria, RBV research subsequent studies (e.g. Eisenhardt and Martin 2000; Teece, Pisano, and Shuen, 1997; Wright et al., 2001; Sirmon, Hitt, and Ireland, 2007; Stadler, Helfat, and Verona, 2013) also suggested that dynamic capabilities should be considered as additional criteria underpinning sustainable competitive advantage, because the external environment is ever changing which requires

changing competences of both the organization and the people. Dynamic capabilities have been defined by Eisenhardt and Martin 2000 (p. 1107) as: “the firm’s processes that use resources- specifically the processes to integrate, reconfigure, gain, and release resources-to match and even create market change. Dynamic capabilities thus are the organisational and strategic routines by which firms achieve new resource reconfigurations as markets emerge, collide, split, evolve, and die. ”A company’s dynamic capability determines its ability to integrate and build internal and external competencies to react rapidly changing environments (Eisenhardt and Martin 2000; Teece et al., 1997; Stadler et al., 2013). Dynamic capabilities require organizations to build processes to obtain renewal core competence such as skills and behaviours because only when the resource is dynamic the organisational competitive advantage can be developed and sustained (Wright et al., 2001; Stadler et al., 2013).

In sum, according to Barney’s (1991) RBV, as developed by other researchers (e.g. Barney and Clark 2007; Eisenhardt and Martin 2000; Stadler et al., 2013; Teece et al., 1997; Wright et al., 2001), desirable resources must be valuable, rare, inimitable, non-substitutable, and dynamic. The above observations suggest that organisations must identify and invest in desirable resources that can be used as sustainable competitive advantages for organisational success. Once a company considers which specific resources they should invest in to establish a competitive advantage, the next question should be how much they will cost and to what extent will the outcomes be effective. This is in line with the claim by Peteraf (1993) and Peteraf and Barney (2003) that it is important to examine both the efficiency and the effectiveness of obtaining or building the resources that might give rise to creating a sustainable competitive advantage for the company.

1.1.2 The added value of positive organisational behaviour

Maintaining or enhancing employee's competency is vital for the organizational success (Nyberg et al., 2014; Wright et al., 1994). Generally speaking, there are two ways for employers to assist their employees in maintaining their competency levels in a dynamic organisational environment: rectify their weakness or negatives (negative approach) or develop their strengths and positives (positive approach). Traditional research in organisational behaviour (OB) has concentrated on the negative approach (e.g. stress; burn-out, job dissatisfaction) (e.g. Luthans, 2002a, 2002b; Luthans and Youssef, 2007a; Wright, 2003; Wright and Quick, 2009) by focusing on employees' weaknesses to prevent poor performance. Negative approach has been described as the four D's approach (damage, disease, disorder, and dysfunction) by Bakker and Schaufeli (2008, p. 148), as the 'disease model' (dysfunctional behaviour causes financial costs) by Macik-Frey et al., (2007), as 'repairing the worst things' by Seligman and Csikszentmihalyi (2000, p. 5), and 'repair shops' by Keyes and Haidt (2003, p. 6). The reasons that researchers have overemphasized the negative approach are understandable: bad effects have stronger effects than the good (Baumeister, Bratslavsky, Finkenauer, and Vohs, 2001; Ito, Larsen, Smith, and Cacioppo, 1998; Skowronski and Carlston, 1989), which is consistent with the conventional wisdom that observes 'one single negative thing can cause a system to fail, but one single positive thing cannot guarantee success' (Cameron, 2008, p. 15) and 'negative events are five times more powerful than positive events for human beings' (Gottman, 1994, cited in Cameron, 2008, p. 15). For example, negative, depressing, or upsetting events weigh more heavily on people's mental health than positive ones, which help bolster good mental health. Consequently, it appears that the negative aspects more often capture researchers' attention, thus leading to the predominance of the negative over the positive.

Indeed, many researchers (e.g. Bakker and Schaufeli, 2008; Luthans and Avolio, 2009; Wright, 2003; Wright and Quick, 2009) have criticized the amount of attention placed on negative aspects, calling for a need to shift research emphasis to the positive and induce positive organisational behaviour (POB) research, which has been defined as ‘the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today’s workplace’ (Luthans, 2002b, p. 59). POB emphasises understanding the strengths and positive attributes in employees that influences employee performance in a proactive way (Luthans, 2002a, 2002b). According to Luthans (2002b), three points characterise POB study. Firstly, the core value of POB research is its performance impact. Secondly, it is research focused on employees’ strengths rather than weaknesses. Thirdly, employees’ strengths must be measurable, dynamic and able to develop. POB research has grown strongly in recent years. For example, Wright, (2003, p. 437) declare that POB research is ‘an idea whose time has truly come’. Turner et al., (2002, p. 715) suggest that ‘it is time to extend our research focus and explore more fully the positive sides, so as to gain full understanding of the meaning and effects of working’. Empirical evidence supports that people are more likely to seek out positive stimuli than negative ones in their daily life, using language, emotional displays, thoughts, judgments, responses, and memorizing and learning (Cameron, 2008). Evidence shows the added value of the positive over and above the negative approach (Bakker and Schaufeli, 2008; Cameron, 2008; Luthans and Youssef, 2007a), and the achieving of success, due to a dominance of the positive over the negative.

1.1.3 Moving from human capital to psychological capital

Generally speaking, researchers have agreed that the human capital offers a source of sustained competitive advantage that is vital to organisations’ success (Luthans et al., 2004, 2007b;

Nyberg et al., 2014; Wright et al., 1994). Traditional human capital is associated with knowledge, skills, abilities (KSA), or competencies derived from education and previous work experience (Luthans and Youssef, 2004), and its value is widely recognized. As a result, human resource management devotes substantial attention to selecting highly skilled employees (Larson and Luthans, 2006; Nyberg et al., 2014), and building and renewing knowledge within the organisation (Luthans and Youssef, 2004; Stadler et al., 2013). The same is true for social capital (Adler and Kwon, 2002; Luthans et al., 2004). However, one can argue that merely having resources that meet the above mentioned five criteria does not guarantee a competitive advantage if the firm does not understand how to use its resources to benefit itself (Barney, 2001; Peteraf, 1993; Wright et al., 2001). Only when organisations adequately deploy their human resource to benefit themselves, can the constitution of competitive advantages from human and social capital be obtained and sustained. Wright et al., (2001, p. 705) suggest that ‘competitive advantage can only be achieved if the members of the human capital pool individually and collectively choose to engage in behaviour that benefits the firm’.

Psychological capital (PsyCap) is a fairly new concept in the POB research field. Luthans is generally regarded as the originator of the concept in the management literature (Luthans, 2002a, 2002b; Luthans et al., 2004; Luthans and Youssef, 2004). PsyCap refers to an ‘individual’s positive psychological state of development that is characterised by: 1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; 2) making a positive attribution (optimism) about succeeding now and in the future; 3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and 4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success’ (Luthans, 2002a, 2002b). In short, PsyCap is a combination of components depicting employees’ personal strengths and positive attributes.

Although new, intensive study has examined the outcomes of PsyCap. For example, a meta-analysis paper of Avey, Reichard, Luthans, and Mhatre, 2011b, including 51 independent samples of 12,567 employees, note that the consequences of PsyCap has been found associated with employees' attitudes, behaviours, and work performance (e.g. Avey, Luthans, and Youssef, 2010b; Avey, Nimnicht, and Luthans, Avolio, Walumbwa, and Li, 2005; Avey, Nimnicht, and Pigeon, 2010c; Luthans, Avey, Clapp-Smith, and Li, 2008a; Luthans, Norman, Avolio, and Avey, 2008c; Peterson, Luthans, Avolio, Walumbwa, and Zhang, 2011; Pigeon, 2010b).

PsyCap also meets the criteria for making competitive advantage of organisations sustainable—valuable, rare, imitable, non-substitutable, and dynamic, and evidence justifies this claim (Luthans et al., 2008a; Luthans and Youssef, 2004; Luthans, Youssef, and Avolio, 2007b;). Most important, PsyCap is now recognized as complementary resource along with those well-recognized resources such as human capital (Luthans et al., 2004, 2007b, 2008) and social capital (Larson and Luthans, 2006; Luthans et al., 2004, 2007b). For instance, a study by Larson and Luthans (2006) finds PsyCap provided additional value above and beyond that of either human or social capital concerning work attitudes. Luthans et al., (2008a) report both human capital and PsyCap significantly predict work performance, but PsyCap had a significant added impact over human capital on work performance outcome.

Furthermore, the nature of PsyCap is state-like (Luthans, 2002a, 2002b; Luthans et al., 2004; Luthans and Avolio, 2009; Luthans and Youssef, 2004, 2007), open to development as opposed to trait-like (i.e. personality). It can be quickly and cheaply intervened and developed by PsyCap intervention (PCI) in terms of training session, but the return on PsyCap development can be potentially dramatic and effective (Luthans, Avey, Avolio, Norman, and Combs, 2006; Luthans, Avey, and Patera, 2008b; Luthans, Avey, Avolio, and Peterson, 2010). Empirical

evidence (e.g. Luthans et al., 2006, 2008b, 2010) indicates that PCI can have a significant increase in participants' PsyCap levels, and also indicates participants' work performance rises after PsyCap training.

1.1.4 Authentic leadership and employees' PsyCap

Like PsyCap and human capital, authentic leadership is also regarded as a vital resource constituting a competitive advantage towards organisational success. Authentic leadership refers to knowing and acting on what is true and real inside the leader's self and in the world (Gardner et al., 2005). The term 'authentic' signals the basic and genuine elements of positive forms of leadership in the POB (Avolio and Gardner, 2005). Research on authentic leadership and employees' PsyCap is particularly important in POB (Luthans and Avolio, 2009; Walumbwa et al., 2011), because authentic leadership incorporates positive aspects (Avolio and Gardner, 2005), and it is proposed that both antecedents and consequences of authentic leadership are POB constructs (Luthans and Avolio, 2003).

Authentic leaders possess a high level of integrity and also display a high level of PsyCap; they are confident, hopeful, optimistic, and resilient (Cooper, Scandura, and Schriesheim, 2005; Gardner and Schermerhorn, 2004; Gardner et al., 2005). Moreover, authentic leaders focus on building followers' strengths rather than focusing on their workers' weaknesses; they lead from their personal beliefs rather than from a desire for their own status or reward; they place high importance on values and refuse to compromise on their principles. Accordingly, high authentic leaders have followers with more positive states of PsyCap (Clapp-Smith, Vogelgesang, and Avey, 2009; Gardner and Schermerhorn, 2004; Walumbwa et al., 2011). Consistent with the assertions made by Avolio et al., (2004) and Luthans and Avolio (2003), Gardner and Schermerhorn (2004) stated that the 'task of the authentic leader is to invigorate people with

POB states”. Moreover, their work provided a guide of the underlying process concerning how authentic leaders influence each state or dimension of PsyCap. Empirical studies also support the notion that authentic leaders foster their followers PsyCap. Eid, Mearns, Larsson, Laberg, and Johnsen, (2012), using samples from the safety industry, reported that authentic leaders instilled positive PsyCap states through their role modelling behaviour, which in turn influenced followers’ safety-focused behaviour. Rego, Sousa, and Marques, (2012) also support the notion that authentic leaders have employees with more positive PsyCap states.

1.2 Research objectives

In response to the call for POB research for sustainable competitive advantage (e.g. Bakker and Schaufeli, 2008; Wright, 2003; Wright and Quick, 2009), this study focuses on PsyCap and authentic leadership but also involves other POB constructs, namely, role modelling, work competence, and organisational citizenship behaviour (OCB) – all positive, fulfilling, work-related states or behaviours. For instance, role modelling is suggested to create a tendency toward the positive (Gouldner, 1960). It is noted that competitive advantage can be achieved if employees individually and collectively engage in OCB (Wright et al., 2001). Work competence is suggested as a sustained competitive advantage (Campbell, Coff, and Kryscynski, 2012, p. 377). This study proposes that the competitive advantage arises from authentic leadership and a flow of competitive resources in a way that is valuable, rare, inimitable, non-substitutable, and dynamic.

The aims of this study are to explore the consequences of authentic leadership and PsyCap, and to fill in research gaps in POB and PCI studies (to be discussed in Chapter 2 and 3). The objectives of this study are:

- 1> To explore consequences of employee PsyCap, whether employee PsyCap affect employee work competence and in turn OCB;
- 2> To explore consequences of authentic leadership, whether authentic leadership affect role modelling and in turn employee PsyCap;
- 3> To explore a model that links authentic leadership to OCB by identifying mediators and testing causality, incorporating the above objective 1) and 2);
- 4> To test the developable nature of PsyCap by introducing PsyCap intervention (PCI) towards leaders;
- 5> To test the transmission effect on the consequences of authentic leadership. In another word, to test whether PsyCap intervention (PCI) will generate positive outcomes for organizations;
- 6> To examine all propositions at both individual level and team level.

The above objectives generate the following research questions:

- As discussed above, factors of authentic leadership, role modelling, PsyCap, work competence, and OCB are all positive and can be used to study the strength of employees and build organisations' competitive advantage. It is important to investigate the relations among these factors. Are they sequentially acquired? For example, does authentic leadership affect leaders' role modelling, which in turn affects employees' PsyCap? Does employees' PsyCap affects employees' work competence, which in turn affect employees' OCB?
- As it is discussed theoretically that PsyCap is valuable, rare, inimitable, non-substitutable, dynamic, and regarded as a sustainable competitive advantage for organisational performance improvement, it is important to conduct more empirical research to replicate and extend previous examinations of PsyCap's dynamic nature, as well as the outcomes

of PCI training, and whether there is an economic way for organisations to consider developing their employees' PsyCap. Specifically, does training leaders' PsyCap affect the level of their PsyCap? Does increasing a leader's PsyCap lead to the increase of positives, including a leader's role modelling, employees' PsyCap, work competence, and OCB in a sequential way?

This study will investigate the above-listed research questions. This study will examine these propositions in working places in China in which production workers report directly to their supervisors and the later report to their line manager. .

1.3 Description of the field work

A series of field studies were conducted in three different organisations producing similar products within the electronics manufacturing industry in China. A valid sample size of 620 workers belonging to 87 teams was obtained through questionnaires conducted over two survey rounds. PCI training was provided for about half of team leaders between the first-round and second-round surveys. Quantitative analysis was undertaken to test descriptive statistics (e.g. correlations and reliability coefficients) by using statistical package for the social sciences using SPSS 19, confirmatory factor analysis (CFA), structural equation modelling (SEM), and two-group analysis using Mplus v.5.2 (Muthén and Muthén, 1998–2007).

1.4 Contribution of the study

This study was designed with the aim of making the following contributions:

In recent years, a growing number of scholars have studied PsyCap and its relation to workplace outcomes, such as work performance, job satisfaction, commitment, and OCB. To echo the call of more research in POB (e.g. Bakker and Schaufeli, 2008; Luthans and Avolio,

2009; Wright, 2003; Wright and Quick, 2009) and also respond to the call for longitudinal research of PsyCap to test the developmental character of PsyCap (e.g. Avey, Wernsing, and Luthans, 2008b), this study provides additional field study of how PsyCap changes over time and the effects on organisational outcomes, such as OCB. Further, this study tested causality by using longitudinal design research.

This study also proposes that role modelling is the mediation process from authentic leadership to employees' PsyCap; therefore, it provides an idea that training authentic leadership and promoting their role modelling behaviour might be a proactive choice for organisations. In line with researchers' recommendations in POB, outcomes of PsyCap might be analysed through certain mediators (e.g. Baron, Franklin and Hmieleski, 2013). This study provides new evidence of work competence as a mediator of the relationship between PsyCap and OCB, consistent with this study by Wright et al., (2001, p. 706) that work competence predicts OCB engagement.

Despite some theorizing on the antecedents of PsyCap, relatively limited empirical study is available; therefore, more such empirical study is needed, as called for by Avey, Avolio, and Luthans, 2011a. Authentic leadership is one of the few studies empirically examined as an antecedent of PsyCap. However, little attention has been paid to the mechanism concerning how authentic leadership influences employees' PsyCap. This study provides new evidence of role modelling as a mediator of authentic leadership's impact on employees' PsyCap.

Although Luthans et al., (2009) point out that current POB is concerned more about micro- and meso-levels, it is moving towards unit and organisational levels, with limited studies available

at the unit level. Thus, this study is a response to the call of Luthans et al., (2009) for more research at the unit level.

Previous studies paid scant attention to the impact of the development of leaders' PsyCap on their followers; this study uses an experimental design to investigate how the training of leaders' PsyCap influences role modelling, through which the levels of their followers' PsyCap, work competence, and OCB can be improved. The finding reports a PsyCap transmission effect – developing leaders' PsyCap can cause an increase of their employees' PsyCap, resulting in the increase of their work competence and OCB, which offers a practical guideline for organisations that training leaders' PsyCap might be the better way to train their employees' PsyCap, as it is more economically effective (e.g. less cost to train fewer employees). This study is the first of this kind, making its contribution to the existing research unique and highly significant.

The research contributes to managerial and business practices. The status of employees' PsyCap might be a more powerful resource to enhance work competence to obtain sustainable competitive advantages for organisations. In particular, it could be developed relatively quickly and more cost effectively than other traditional resources (e.g. human capital, social capital) that contribute to organisational success.

This study provides a model demonstrating that building up sustained competitive advantage is a dynamic process and authentic leadership leads to role modelling, which in turn develops employees' PsyCap. Employees' PsyCap contributes to creating work competence, resulting in OCB. To the best of our knowledge, this combined approach, examining the causality between PsyCap and human capital, has not been studied in POB before. This is consistent with a

previous suggestion proposed by Wright et al., (2001, p. 706) that ‘sustained competitive advantage is not just a function of single or isolated components, but rather a combination of human capital elements’.

1.5 Outline of the thesis

The thesis is organised into eight chapters and the content of each chapter is reviewed below.

This chapter, Chapter 1, discusses the importance of the research topics, the objectives and research questions of the study, and the potential contributions.

Chapter 2 reviews relevant managerial theories (e.g. social learning theory, emotion contagion and broaden-and-build theory, conservation of resource theory, goal setting theory, and social exchange theory), each of the observed variables (authentic leadership, role modelling, PsyCap, work competence ,and OCB), and a range of key studies in this research field. These theories will be used as theoretical perspectives underpinning the hypothesised model incorporating the five variables in Chapter 4.

Chapter 3 reviews the literature on PCI, as well as the training effects (e.g. the change of the level of PsyCap and work competence). The developmental character of PsyCap is discussed. The method of PCI training is described, followed by a brief review of a range of studies on PCI. Next, experimental research on the effects of PCI is reviewed. Finally, comments on potential means to further develop the PCI research are offered.

Chapter 4 formulates the hypothesised model using theories introduced in Chapter 2. The antecedent relationship from authentic leadership to PsyCap through role modelling’s

mediation role is discussed. The consequent relationship from PsyCap to OCB through work competence's mediation role is discussed. The prediction of the effects from PCI is provided.

Chapter 5 discusses the research methodology adopted in the study. The contextual background of the field study is provided. Sample and data collection procedures are described. PCI procedures are discussed. Each measure of this study variables as well as an analysis of their reliability is presented. Also discussed are the data analysis techniques, providing reasons for the use of SEM to test both individual and group level hypotheses.

Chapter 6 presents results. It also presents results of the CFA that provides support for the distinctiveness of the individual and group level variables. It presents results of testing casual hypotheses and mediations at individual and team levels. It examines the effects of PCI by comparing two groups, the treatment and control group. The analyses are described and results presented.

Chapter 7 summarizes the key findings and discusses their theoretical implications. .

Chapter 8 presents general conclusions. It recaps this study' objectives and reflections pertaining to achieving the research objectives are offered. It addresses the study's strengths and limitations, and concludes with suggestions for, and implications of, future research and management practice.

A detailed explanation of the selected theories, including RBV (Barney, 1991; Newbert, 2008; Wernerfelt, 1984, 1995; Wright et al., 2001), social learning theory (SLT) (Bandura, 1977, 1986), emotion contagion theory (Schoenewolf 1990), broaden-and-build (BB) theory

(Fredrickson, 1998, 2001), conservation of resource (COV) theory (Hobfoll, 1989, 2002), and goal-setting theory (Bryan and Locke 1967; Locke, 1967; Locke and Bryan 1969; Locke and Latham, 1990), as well as each of the concepts along with reviews on previous studies, are provided in Chapter 2.

Chapter 2 : Theoretical frameworks and literature review

This chapter reviews some of managerial theories used in POB research, and observed variables in this study. Theoretical frameworks include theories used in previous studies, are reviewed. Observed variables cover five concepts in the POB field: authentic leadership, role modelling, PsyCap, work competence, and OCB. Each part follows the same structure. Firstly, a critical review of the existing research is provided in each research domain. Next, related studies are reviewed. After reviewing the literature on each of the five variables, a summary of studies at the unit level is followed, as there are not many studies at that level. Finally, limitations of studies are summarized. This chapter serves a foundation to develop the hypotheses (Chapter 4) used in this study.

2.1 Theoretical frameworks

Theoretical foundation of authentic leadership and PsyCap is based on positive psychology and positive organisational behaviour. A literature review of the published research on authentic leadership and PsyCap studies offers the following theories that have been adopted as explanatory mechanisms in developing hypotheses: social learning, emotion contagion, broaden-and-build, conservation of resource, goal-setting, and social exchange. Despite their differences, they are complementary rather than competing.

2.1.1 Social learning theory (SLT)

Miller and Dollard (1941) produce the seminal study that coined the term and addressed the theory of ‘social learning’. They posit that individuals observe other peoples’ behaviour, transforming and storing it as a cognitive resource, even copying the behaviour if it leads to positive benefits. Their work opened the gates to a flood of social learning studies.

SLT contains both behavioural and cognitive dimensions, and adopts a dynamic view by integrating the interaction between individuals and the environment (Buchanan and Huczynski, 2007). Both behaviourists and cognitive psychologists agree the social learning process results in a change of an individual's knowledge and behaviour, although they have different opinion on how this change takes place (Buchanan and Huczynski, 2007).

According to Buchanan and Huczynski (2007), one of the most influential theorists of social learning is Bandura (1977, 1986, 1997). Bandura's famous 'Bobo doll' experiment serves as an important foundation for the development of the behaviour modelling process. Initially conducted in the 1960s, the experiment begins with a group of children observing an adult (the role model) acting violently towards a doll (namely 'Bobo doll'). The adult punches, kicks, and tosses the doll, even hitting it in the face. Thus, the children witness the adult role modelling expressing physical and verbal aggression. Afterwards, when the children are allowed to play with the doll, they demonstrate the same negative physical behaviour and emotional aggression towards it. Notably, not only are the adult role modelling's actions copied but also the negative violent emotions of violence (e.g. violently hitting the doll in the face, being verbally aggressive). Following the original 'Bobo doll' experiment and subsequent experiments, Bandura (1977,1986), proposed six sequential phases of behaviour modelling that involve attention, retention, reproduction, motivation, self-regulation, and self-efficacy. Peoples' observational learning begins with paying attention to the key behavioural examples or role models, resulting in stored and memorized information. Once retained, information concerning the role model can be recalled, even when s/he is not present. Therefore, the ability to actually (re) produces the behaviour via observation increases through frequent replication and practicing the learned behaviour. If the new approach brings no benefits, it will be abandoned, and the search will begin to look for new models. On the contrary, however, when people see

the new behaviour is successful or leads to the desired results, it motivates them to use it again, leading to reinforcement of the learned behaviour. Gradually, people grow able to choose role models and pay attention to their key behaviours to imitate; accordingly, they can determine and regulate their own behaviour, based on judging what is and is not appropriate. Peoples' self-efficacy in their own ability to execute the behaviours of role models is thus enhanced. Bandura (1977, 1986) suggests people learn not only new behaviours but also attitudes and emotional reactions of others through behavioural modelling, observing, and imitating others in social contexts.

2.1.2 Emotion contagion and broaden-and-build (BB) theory

According to Schoenewolf (1990, p. 50), emotion contagion refers to 'a process in which a person or group influences the emotions or behaviour of another person or group through the conscious or unconscious induction of emotion states and behavioural attitudes'. Emotion contagion can occur at both subconscious and conscious levels (Druckman and Bjork, 1994; Kelly and Barsade, 2001; Totterdell, 2000). For example, Ilies et al., (2005) propose by working together on daily activities, authentic leaders and followers' emotions and moods will converge through the process of emotional contagion.

BB theory suggests that positive emotions broaden people's momentary thought-action repertoires, and that in turn these build enduring personal resources (Fredrickson, 1998, 2001). The BB theory (Fredrickson, 1998, 2001; Fredrickson and Cohn, 2008) contains three key propositions. Firstly, it describes positive emotions, including joy, interest, contentment, and love, broadening the scopes of attention and cognition, such as exploring creative actions, ideas, and social bonds. Secondly, it predicts this broadened mind-set in turn will build enduring personal resources. Thirdly, a reciprocal relationship exists between positive emotions and their

consequence. Specifically, positive emotions predict resources that in turn trigger future positive emotional experiences. Unlike negative emotions, which narrow peoples' attention, cognition, and behaviour, and that aim at coping with an immediate and specific threat or problem (Carver, 2003; Cosmides and Tooby, 2000), positive emotions widen the array of thoughts, actions, and concerns about personal growth and development over the long term (Cohn, Fredrickson, Brown, Mikels, and Conway, 2009; Fredrickson and Losada, 2005). Negative emotions are necessary, even though their effects are the opposite of positive emotions, because negative emotions can stimulate competition for attention with positive emotions (Cohn et al., 2009). It is also suggested that resources built up via positive emotions will not be depleted, as long as negative emotions remain under control. This claim is supported by another study by Fredrickson and Losada (2005), which proposes 2: 9 is the ratio of positive to negative effect, as a key predictor of flourishing or languishing.

Evidence from laboratory experiments by Fredrickson and her colleagues conducted over 20 years supports the view that positive emotions generate personal resources, although these studies used only students as samples. For instance, empirical studies show that positive emotions facilitated in coping ability (Fredrickson and Joiner, 2002; Burns et al., 2008) and trust over time (Burns et al., 2008), and both studies offer support for a reciprocal relationship between the positive and its outcomes. Empirical study by Cohn et al., (2009) suggests that positive emotions predict increases in both resilience and life satisfaction, and their further analysis reports a fully mediating role of change in resilience between positive emotion and change in life satisfaction.

According to the BB theoretical framework (Fredrickson, 2003; 2004), personal resources derived from positive emotions consist of four dimensions: physical, intellectual, social, and

psychological. As an example, the author uses a group of adults enjoying a game of basketball in the gym, pointing out that while they play, they are building physical, intellectual, social, and psychological resources. The physical activity leads to long-term improvement in health; game-playing tactics develop problem-solving skills; team cooperation during playing basketball makes them new friends; positive emotions experienced from game-playing broaden their positive learning, contributing to optimism; and the experience of winning or losing and competing itself develops their goal orientation of character, strengthening their resilience and optimism. In sum, emotion is contagious, and the resources built up by positive emotion can endure, even though emotion itself is fleeting.

Positive emotion can be improved through intervention, such as self-generating interventions. For instance, Cohn and Fredrickson (2010), using 202 participants from workplaces, proposed that the method of self-generating positive emotions can be learned. Their studies indicate that continuing to self-generate positive emotions leads to more positive emotions. The resources (e.g. pathways thinking, resilience, dyadic adjustment) built up during the intervention will not be lost, even after the interventions end, which supports the BB theory that resources built via positive emotions are durable. A more recent conceptual study by Algoe and Fredrickson (2011) proposes a framework of positive emotion training aimed at improving resilience in military units. Their training program consists of three steps: basic training to learn concepts of emotion and its consequences, emotion regulation, and optimizing the emotional landscape for the self and others. The value of such emotion resilience training for helping soldiers become more flexible and responsive when facing danger is promising, but it is rather challenging to put it to the test in military contexts.

2.1.3 Conservation of resource theory (COR)

COR theory suggests people ‘seek to obtain, retain, and protect resources, and that stress occurs when resources are threatened with loss or are lost or when individuals fail to gain resources after substantive resource investment’ (Hobfoll, 2002, p. 312). According to the resource conservation model developed by Hobfoll (1989, 2002), people strive to retain, protect, and build resources. Potential or actual valuable resource losses or the inability to acquire resources produces stress. In a review of resource theories in psychology, Hobfoll (2002, p. 307) defines resources as ‘those entities that either are centrally valued in their own right (e.g. self-esteem, close attachments, health, and inner peace) or act as a means to obtain centrally valued ends (e.g. money, social support, and credit)’. In the workplace, COR theory provides an explanation as to ‘how employees acquire, maintain, and foster the necessary resources to both meet their current work demands and to help guard against further resource depletion’ (Wright and Hobfoll, 2004, p. 390), and suggests four types of resources employees are keen to conserve: objective resources (e.g. home), conditions (e.g. tenure, seniority), personal character (e.g. personal traits, skills), and energy (e.g. time, money, knowledge). Lyubomirsky et al., (2005) propose resources such as attributes and skills help people thrive and succeed at work, in relationships, and in health. Further, experimental studies have shown those induced into a positive state report higher self-perceptions, such as efficacy (Baron, 1990; Schuettler and Kiviniemi, 2006), maintain optimistic expectations (Brown, 1984), and set higher goals for themselves (Baron, 1990; Hom and Arbuckle, 1988).

COR theory stands out, because it acknowledges and emphasizes the means for positive adaptation under circumstances of loss. Relevant to the workplace, COR theory highlights the importance of motivation for decisions involving acquire and invest in resources. One’s ability to acquire and maintain resources is both a means and an end – a means for achieving success

and an end that includes adapting, coping, and feeling well. Further, secondary work-related resources, such as high levels of cognitive and emotional attachment to one's occupation (Wright and Hobfoll, 2004) are important for influencing people's primary resources, such as their well-being (Wright and Bonett, 2007). Due to differing abilities in acquiring and maintaining resources, individuals conserve various resources that might in turn differentiate individuals' adaptation, coping, and well-being skills currently or in the future. Thus, COR theory serves as the theoretical foundation in this study, for both the antecedent of positive PsyCap and the outcome of well-being.

2.1.4 Goal - setting theory

Goal-setting theory is a cognitive concept and regarded as a process motivational theory. A goal is the object of an action, similar in meaning to the concepts of purpose, intent, and task (Locke, 1967; Locke and Bryan 1969; Bryan and Locke 1967). The theory argues that goal difficulty, goal specificity, participation in goal setting, and feedback shape work motivation. It proposes that setting a clear, challenging goal results in better work performance than setting a vague, more easily obtainable goal, and that participating in goal setting and receiving feedback helps enhance work performance (Locke and Latham, 1990). According to previous studies (Bryan and Locke 1967; Locke, 1967; Locke and Bryan 1969; Locke and Latham, 1990), at least four mechanisms operate causing goals to affect performance. Goals direct attention and actions toward goal-relevant activities and toward ignoring goal-irrelevant activities. Goals have an energizing function, leading to greater effort for individuals with high goals than low ones. Goals affect actions, with high goals increasing persistence. High goal-oriented individuals are motivated to mobilise task-relevant knowledge and resources to develop appropriate action plans or performance strategies.

According to the 35-year-long longitudinal study of Locke and Latham (2002) concerning the application of goal-setting theory, based on research involving more than 40,000 participants in eight countries in laboratory, simulation, and field work settings, it was demonstrated that setting specific challenging goals leads to enhanced work performance and job satisfaction, which remains true not only for individuals but also for groups and organisations.

Studies also have discovered people's motivations for setting clear, challenging goals, which contain both psychological and functional aspects. Psychologically, attaining a challenging goal enhances task interest (Bryan and Locke 1967; Locke, 1967; Locke and Bryan 1969; Locke and Latham, 1990), makes activities more pleasant and meaningful (Harackiewicz, Manderlink, and Sansone, 1984), and increases the chance for good performance and job satisfaction (Mento, Locke, and Klein, 1992). Functionally, leaders expect workers to set specific, challenging goals. Under effective leadership, feedback was provided relating to the requirement of their goals, goal adjustment, and goal attainment, which led to more challenging goal-setting. Operating under the concept that high self-efficacy people set higher goals than do people with lower self-efficacy (Bandura, 1997; Seijts and Latham, 2001), effective leaders are more likely to develop the self-efficacy of their people for the achievement of challenging goals, ultimately resulting in better work performance.

2.1.5 Social exchange theory (SET)

Blau (1964, p. 91) defines social exchange as 'voluntary actions of individuals that are motivated by the returns they are expected to bring and typically in fact bring from others'. Blau (1964) views social exchange as an on-going reciprocal process, and there are internal perspectives and external perspectives based on different foci. Burt (1992, p. 9), offering influential work from an external perspective, introduced the idea of social capital, defining it

as ‘friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital’. This definition itself suggests that human capital can be used to develop social capital. According to a conceptual model of social capital proposed by Adler and Kwon (2002), social capital can be generated by presenting three sources: opportunity, motivation, and ability. In workplaces, particularly within the team-work structure, face-to-face interaction provides employees with possibilities for both building network ties and mobilising resources. The motivation of social exchange lies in the expectation of receiving either immediate or future returns. Abilities or the necessary expertise of ‘donors’ are requisite, obviously, because otherwise the contribution is of little use. It should be pointed out the social exchange relationship can be developed not only among employees but also between employees and managers. In sum, SET proposes people’s social interaction is an exchange of resources.

2.1.6 Applying the theories in empirical correspondent studies

The above -referenced theories have been widely used as explanatory mechanisms in POB research.

Bandura’s (1977, 1986, 1997) SLT has been used to explain the development of follower authenticity, the development of PsyCap, the effects of leader PsyCap on follower PsyCap, and role modelling’s impacts on follower’s performance. For example, Ilies et al., (2005) used SLT to explain how authentic leaders develop follower authenticity. They suggest learning can occur through vicarious experience, via observing mastery experience demonstrated by authentic leaders; hence, followers can acquire authenticity from observation (social learning). Peterson et al., (2011), using a sample of 179 employees from the retail advisory department of a financial service company in the United States, report that individuals’ PsyCap declined over

three time points. They suggest Bandura's (1977, 1986, 1997) SLT provides an explanation for PsyCap's malleability. Specifically, the extent of master experience, modelling, and feedback will cause changes in employees' efficacy, according to Bandura's (1977, 1986, 1997) SLT. These changes in self-efficacy will lead to an overall change of PsyCap, due to synergistic effects of its constructs. Walumbwa et al., (2010b), using data from a sample of 79 police leaders and their direct reports (264 police officers) from the United States, report a positive relationship between leader and follower PsyCap, applying both SLT and emotion contagion theory. From the SLT point of view, high PsyCap leaders serve as role models by displaying high levels of positivity, which followers are more likely to observe and emulate (Bandura, 1977), in associating with their leader's PsyCap. Therefore, a transmission of leader–follower positive attributes will occur. Luthans et al., (2011), using a sample of 1,526 employees who agreed to participate in a large U.S. Midwestern university sponsored-research project, reported that employees' current PsyCap is positively correlated to future PsyCap ($\beta = 0.66, p = 0.001$), derived via SLT and emotion contagion theory. Specifically, due to PsyCap's developmental nature, the current level of overall PsyCap can be developed through vicarious learning and psychological arousal (Luthans et al., 2010). The resultant increased cognitive and capacity can facilitate more PsyCap for employees in future circumstances. Rich (1997), using a total sample of 183 salespeople–manager dyads from 10 different American companies, reports that salespeople's perceptions of their managers' role modelling behaviour relate positively to trust in the sales manager and relate indirectly, through trust, to both job satisfaction and overall performance of salespeople. He explains that sales people acquire much of their behaviour by observing and imitating their sales manager, according to Bandura's (1977, 1986, 1997) SLT.

Emotion contagion theory (Schoenewolf, 1990) has been used in explaining the change of PsyCap over time and the transference of leader–follower PsyCap. For example, although

Peterson et al., (2011) did not test why PsyCap could determine performance, they did advocate future research should explore it from theoretically explanatory processes (e.g. emotion contagion). In their case, salespeople who have a high level of PsyCap are more likely to affect their clients by being in a more positive mood, due to emotion contagion, which could help them generate more purchases and investments, contributing to their overall sales performance.

Walumbwa et al., (2010a) find that besides SLT, emotion contagion theory also has been used to theorise the hypothesis that leaders can influence followers' PsyCap via their own PsyCap. They suggest that the positivity leaders displayed may rub off on followers through the emotion contagion process. Consistent with previous research by Bono and Ilies (2006), leaders' positive emotional expressions affected their followers' moods positively. Luthans et al., (2011) find that in addition to SLT, emotion contagion theory also has been mentioned in explaining the positive relationship between current and future PsyCap. From the emotional contagion point of view, positivity beget an upward spiral of positivity (Barsade, 2002).

BB theory (Fredrickson, 1998, 2001, 2003, 2009) has been used often to explain PsyCap's positive consequences, consisting of well-being, work performance, OCB, and problem-solving and innovation. For example, Culbertson et al., (2010) used a longitudinal approach consisting of 102 agents from a U.S. Midwestern state and suggest positive thoughts create a positive spiral generating further positive experiences, thoughts, and feelings, beneficial for optimal employee well-being (Fredrickson, 2001). Avey et al., (2011b) referred to Fredrickson's (2003) BB theory as offering an explanation that high PsyCap employees are more likely to exhibit more OCBs, due to a broadened contribution of their positivity in which people utilize broader thought-action tendencies, leading to proactive extra-role behaviours. Luthans et al., (2011) used a cross-section sample of 1,526 employees who agreed to participate in a large U.S. Midwestern university sponsored-research project, and they report PsyCap is positively related

to both problem-solving performance and innovation. They explain positivity induces a broadening of thought–action repertoires (Fredrickson, 1998, 2001, 2009), leading employees to be more innovative and more capable of integrating thoughts and ideas to produce both a high quantity and quality of problem-solving ability.

Empirical studies adopted COR theory (Hobfoll, 1989, 2002) as a mechanism in the rationale. For example, Avey et al., (2010a) use a sample of a cross-section of employees ($N = 280$) who agreed to participate in a U.S. Midwestern university sponsored-research project on employees in workplaces. They tested the level of PsyCap and two measures of psychological well-being over time. Results indicate that employees' PsyCap was related to both measures of well-being. Peterson et al., (2011), examining 179 employees from the retail advisory department of a large financial service organisation based in the northeastern United States, found a positive relationship between change in employee PsyCap level and change in performance, measuring both supervisor-rated performance and sales revenue. They used COR theory (Hobfoll, 2002; Wright and Hobfoll, 2004) to explain employees are motivated to build up their PsyCap resources over time to attain successful future performance. Therefore, increasing employees' PsyCap provides more resources and a stronger foundation for them to draw on and improve subsequent performances. Culbertson et al., (2010) proposes that PsyCap serves as a personal characteristic resource; one of the four resources identified in Hobfoll's (1989) COR theory. They report employees seek to acquire and maintain resources, and when they achieve a high level of PsyCap, they are more likely to feel happy, leading to an increased sense of well-being.

SET (Blau, 1964) has been widely used to explain the rationale of employees in acquiring potentially available resources or undertaking extra-role behaviours (OCB) for extra benefits. For example, Adler and Kwon (2002) suggest people are likely to act in a social exchange to

obtain social capital, even when the resources are not immediately available. Lambert (2000) suggests people may feel obligated in the exhibition of OCB when they receive additional benefits, because OCB behaviour is the currency of reciprocity used to produce 'balance sheets'.

2.2 Authentic leadership

2.2.1 Differentiating authentic leadership from other forms of leadership

Leadership refers to the 'process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task' (Chemers, 1997). It is acknowledged that leadership styles are varied and overlapping, in that some leadership styles involve some of the same characteristics. For example, Shamir, House, and Arthur (1993) argue that transformational leadership incorporates charismatic leadership. However, it is also acknowledged that leadership styles are compatible and complementary (Judge and Piccolo, 2004).

Avolio and Gardner (2005) compare different leadership styles and suggest the effects of leaderships on their followers are apparently different. For example, servant leaders are characterised by listening, empathy, and foresight, and they care for the needs of others before their own. They put themselves at the position of steward to serve employees (Greenleaf 2002, 2003), rather than build and cultivate employees' capability. As a result, employees may experience little opportunities for development, due to limited chances to motivate them to try harder. Spiritual leaders tend to care about their followers, based on a sense of altruistic love. They might include self-awareness in appraising their own behaviour, but their self-regulation and followers' self-awareness/regulation is missing (Fry, 2003). Transactional leadership is characterised as management by contingent reward; it focuses on supervising and building a management system for the exchange of desired behaviour (Howell and Avolio, 1993).

Rewards might be the key motivator under transactional leadership: Transactional leaders are given power so that employees will receive rewards or punishment, according to a predetermined and targeted result (Burn, 1978). Obviously, transaction leadership does not deliver self-awareness and self-regulation but the exchange system. Transformational leaders are regarded as emphasising the impact of team effectiveness and efficiency (Bass, 1985, 1998); they focus on selling company value by aligning followers' interests with the company's interest. Transformational leaders tend to be proactive and have forward-looking (Kouzes and Posner, 1995). Transformational leaders are regarded to be self-aware and regulate their behaviour, meanwhile monitoring and developing the status of followers' PsyCap to achieve the expected results.

Avolio and Gardner (2005) discuss the concept that authentic leadership incorporates some of the positive aspects of transformational, charismatic, servant, and spiritual leadership. Authentic leadership refers to a leadership style that a leaders' action is consistently shaped by an ethical value system (Gardner et al., 2005). Authentic leaders are regarded as having a high level of integrity and displaying confidence, hope, optimism, and resilience (Gardner et al., 2005; Cooper et al., 2005). As noted in Chapter 1, authentic leaders focus on building followers' strengths rather than focusing on their people's weaknesses; they lead from a core of personal beliefs rather than a desire for personal status or reward, placing high importance on values and refusing to compromise on principles. Theoretically, obtaining one's own high PsyCap and developing followers is characteristic of an authentic leader (Gardner and Schermerhorn, 2004; Gardner et al., 2005). Although other leadership theories such as transformational, charismatic, servant, and spiritual leadership include 'vision' as a central component (Bryman, 1992), a key differentiation is that authentic leadership is more genuine and true (Gardner et al., 2005).

Leadership styles are listed below in Table 2–1, comparing the various dimensions of positive moral perspective, leader PsyCap, leader self-awareness and self-regulation, and follower self-awareness and self-regulation among the various leadership styles.

Table 2–1: Comparing leadership theory on PsyCap development

Dimensions	Authentic	Transformational	Transactional	Charismatic	Servant	Spiritual
Positive moral perspective	√	√	×	√	√	√
Leader PsyCap	√	√	×	×	×	√
Leader self-awareness	√	√	×	×	√	√
Leader self-regulation	√	√	×	×	√	×
Follower self-awareness	√	√	×	×	×	
Follower self-regulation	√	√	×	×	×	×

Source: Avolio and Gardner (2005)

According to the comparison in Table 2–1, authentic and transformational leadership share many common characteristics. For example, they are linked with leader PsyCap. By contrast, on the one hand, servant leadership, transactional leadership, and charismatic leadership do not impact their PsyCap. These three leadership styles incorporate leader self-awareness and self-regulation, through which a contribution to their increase in PsyCap can be expected. On the other hand, certain unique characteristics of authentic leadership and transformational leadership might lead to PsyCap impacts on their followers. For instance, transformational leaders tend to be forward-looking (Kouzes and Posner 1995). As a result, the awareness of having a proactive plan and alternative solutions might be always available, which can in turn increase PsyCap of followers. Similarly, characteristics of being ‘relationally transparent’ and promoting ‘balanced processing’ (Avolio, Gardner, Walumbwa, Luthans, and May, 2004; Avolio and Gardner, 2005; Ilies, Morgeson, and Nahrgang, 2005), could possibly establish a positive ‘sample’ or ‘model’ which shall allow followers’ PsyCap to flourish.

In sum, both authentic leadership and transformational leadership could affect both the leader’s PsyCap, as well as that of followers. This study chose to focus on authentic leadership rather than transformational leadership, for the following reasons:

Firstly, authentic leadership is commonly seen as a positive leadership form to produce positive work outcomes. As a result, more interest should be given to authentic leadership in the POB domain. Secondly, although there is overlap between transformational and authentic leadership, and ethical and authentic leadership (Avolio et al., 2004; Avolio and Gardner, 2005; Walumbwa, Avolio, Gardner, Wernsing, and Peterson, 2008), it has been demonstrated conceptually (e.g. Avolio and Gardner 2005) and empirically (e.g. Walumbwa et al., 2008) that authentic leadership can uniquely predict work outcomes beyond ethical and transformational leadership. For instance, Avolio and Gardner (2005) suggest that the key distinction between authentic leadership and transformational leadership is an authentic leader may not actively develop a follower to transform him or her into a leader; instead they may develop their followers' strength and positive behaviours which are more beneficial to both individuals and the organisations.

Walumbwa et al., (2008) precisely demonstrate that authentic leadership relates to ethical leadership and transformational leadership but accounts for additional unique variance in follower outcomes, such as OCB when controlling for ethical leadership and transformational leadership. Thirdly, while this study recognizes that other forms of leadership can be effective as antecedents of employee PsyCap via the process of role modelling (Bass, 1985), so can authentic leadership (Avolio et al., 2004; Avolio and Gardner, 2005). Fourthly, authentic leaders are concerned with their followers' long-term self-development (Avolio et al., 2004), rather than focusing on the alignment of followers' interests with the company's interest (Avolio, 2005; Bass, 1985), and this differentiates authentic leadership from inauthentic leadership. Consequently, authentic leaders' serving as role models not only exert their influence on followers' PsyCap but also develop work competence of their followers. As Walumbwa et al.,

(2008) suggest, authentic leadership is not just the behaviours associated with a style but leaders' ability to know themselves and to use this knowledge to learn with and develop their followers' best qualities. Hence, this study's primary goal is to identify the process by which authentic leaders will have the greatest impact on their followers' PsyCap on their work competence and OCB.

2.2.2 Four dimensions of authentic leadership

The definition of authentic leadership varies among scholars over the years. According to the review paper by Gardner et al., (2011, p. 1121), Luthans and Avolio (2003), for the first time, defined authentic leadership since 1960s when the earliest philosophical conceptions of authentic leadership arose. Luthans and Avolio (2003, p. 243) define authentic leadership 'as a process that draws from both positive psychological capacities and a highly developed organisational context, which results in both greater self-awareness and self-regulated positive behaviours on the part of leaders and associates, fostering positive self-development'. Their definition of authentic leadership includes positive psychological capacities. On base of Luthans and Avolio's (2003, p. 243) definition of authentic leadership, Avolio, Luthans, and Walumbwa (2004) developed it by incorporating psychological capacities as construct of authentic leadership. Avolio, et al., (2004, p. 4) define authentic leaders as 'those who are deeply aware of how they think and behave and are perceived by others as being aware of their own and others' values/moral perspectives, knowledge, and strengths; aware of the context in which they operate; and who are confident, hopeful, optimistic, resilient, and of high moral character'. Subsequent studies produced rich conceptual works of authentic leadership, but the definition advanced by Walumbwa et al., (2008) has been one of the most influential one (Gardner et al., 2011). This is because of its grounding in multicomponent of authenticity and its having been founded upon various previous works (e.g. Avolio et al., 2004; Avolio and Gardner, 2005;

Gardner, Avolio, Luthans, and Walumbwa, 2005; Ilies et al., 2005; Luthans and Avolio 2003;). Walumbwa et al., (2008, p.94) define authentic leadership as

a pattern of leader behaviour that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of leaders working with followers, fostering positive self-development.

This study adopts the definition of authentic leadership advanced by Walumbwa et al., (2008). As stated, their definition has built upon previous works, and it is regarded as one of the most influential definitions (Gardner et al., 2011). Although this study of authentic leadership has received considerable attention in recent years, the debate continues as to what constitutes authentic leadership. It is clear, however, that authentic leadership is multidimensional in nature. The extant literature suggests four key behaviours are associated with authentic leaders: balanced processing, internalized moral perspective, relational transparency, and self-awareness. The term ‘balanced processing’ first appeared in work by Gardner et al., (2005), and in works by Ilies et al., (2005) with the same meaning but a different name, ‘unbiased processing’.

According to Walumbwa et al., (2008), balanced processing refers to a leader who objectively analyses all relevant data before making decisions. This includes processing information that contradicts or challenges his/her initial point of view, and listening to others’ opinions before coming to conclusions (Gardner et al., 2005). A leader guided by internal moral standards and values, and who acts according to these, even against group, organisational, or societal pressures is described as having an internalized moral perspective. This involves a consistency

between beliefs and actual deeds, and making decisions, even difficult ones, based on high standards of ethical conduct and core values. Relational transparency refers to presenting one's authentic self (as opposed to a fake or distorted self) to others. This is manifested in behaviours, such as openly sharing information and expressing one's true thoughts and feelings in interpersonal interaction, albeit in consideration of contextual factors (i.e. avoiding inappropriate emotional expressions). This includes displaying emotions, words, and actions in line with their true feeling and means, admitting mistakes when things go wrong, and encouraging everyone to speak their mind. Self-awareness refers to a process of reaching a deeper understanding of one's strengths and weaknesses (Gardner et al., 2005), which includes constantly re-assessing one's self-concept through exposure to and feedback from others, and being cognizant of one's impact on other people. In short, the dominant conceptualization of authentic leadership in the scientific literature (Gardner et al., 2011) proposes that authentic leaders are guided by sound moral convictions and act in concordance with their deeply held values, even under pressure. They are keenly aware of their views, strengths, and weaknesses, and strive to understand how their leadership impacts others.

2.2.3 Key characteristics of authentic leadership

Key characteristics of authentic leadership include integrity, personal authenticity, being a role model, creating conditions for trust and respect, and adding value and having a sense of doing the right thing (Avolio and Gardner, 2005; Gardner et al., 2005; Gardner et al., 2011; Walumbwa et al., 2008). Each of these characteristics could serve as a core element fostering positive relationships between authentic leaders and their followers. Consequently, the leadership influence could be strengthened.

2.2.3.1 Credibility and admirability

By definition, authentic leaders are regarded as displaying high levels of moral integrity in line

with their values (Gardner et al., 2005; Luthans and Avolio, 2003). Authentic leaders openly share information in order to serve the group's common interest, even though it may be in direct conflict with their individual self-interest (Avolio, 2005; Luthans and Avolio, 2003; May, Chan, Hodges, and Avolio, 2003). In turn, this genuine desire to serve others may engender credibility. Sufficient studies suggest that authentic leaders are credible, admirable, and trustworthy. According to Avolio et al., (2004, p. 806), authentic leaders 'act in accordance with deep personal values and convictions to build credibility and win the respect and trust of followers'. Ilies et al., (2005) proposes that authentic leaders' personal integrity and self-awareness lead to unconditional trust from their followers, which in turn will influence followers to personally identify with the leader. Walumbwa et al., (2008) suggest that authentic leaders act in accordance with deep personal values and convictions to build credibility and win followers' respect and trust. Other researchers (e.g. Kouzes and Posner, 2002; Peus, Wesche, Streicher, Braun, and Frey, 2012; Sparrowe, 2005;) also suggest that authentic leaders win credibility and respect. Rego et al., (2012) note that by receiving constructive criticism and feedback in a respectful and developmental manner from authentic leaders (Ilies et al., 2005; Luthans and Youssef, 2004; Luthans et al., 2007b), employees may feel gratitude and identify with them, even want to become more like them. When authentic leaders solicit views that challenge deeply held positions and openly share information with employees, they may gain their employees' admirability. The rationale was that such consistency and alignment engenders credibility.

2.2.3.2 Positive emotion

Authentic leaders tend to display positive emotion due to their self-awareness associated with authenticity. Authentic leaders are aware of the consequence of not only positive emotions (e.g. pride, gratitude, and satisfaction), but also negative emotions (e.g., shame and guilt), thereby

avoiding negative behaviours and instead, engaging in positive emotions (Tangney, 2003; Walker, 2010). The importance of positive emotions for developing authentic leadership has been studied by Michie and Gooty (2005) who suggest that positive emotions contribute to authenticity and help authentic leaders gain respect.

Whether authentic leadership causes positive or negative emotions is somewhat unclear, but it is clear a meaningful relationship exists between authentic leadership and positive emotion. Moreover, the extant literature suggests that authentic leaders not only cultivate positive emotions within themselves, but also they are more likely to have followers with positive emotions. For instance, Avolio et al., (2004) report authentic leaders can create positive emotions among followers through identification, both personally and socially. Ilies et al., (2005) suggest authentic leaders create an atmosphere conducive to the experience of positive emotions, because their own positive emotions influence followers' experiences. Walker (2010) suggests authentic leaders' self-awareness contributes to their positive emotions.

This study recognizes that both affective process and cognitive elements may be achieved in the course of authentic leadership effectiveness. As noted by Lord and Brown (2004), previous leadership theories have generally focused more on cognitive elements, with the theory and measurement of affective processes having been ignored by leadership researchers. Recently, researchers (e.g., Ashkanasy and Tse, 2000) have pointed out the importance of emotions in the leadership process. A special issue of *The Leadership Quarterly* (2002) that examines the subject of emotions and leadership attests to the important role of emotions in leadership effectiveness. This study responds to this call by including positive emotions, positive PsyCap states, competence, and OCB as outcomes of authentic leadership via the role modelling process.

2.2.3.3 PsyCap

Bass (1985, 1998) and Burns (1978) claim transformational leaders are optimistic and hopeful, which necessitates a leader's positive PsyCap. Authentic leadership overlaps with transformational leadership and is commonly seen as a positive leadership form; hence, PsyCap would be a manifestation of authentic leadership. Moreover, according to the definition of PsyCap by Luthans (2002), authentic leadership as a process arises from positive psychological capacities, including the POB states of confidence, hope, optimism, and resilience. Luthans and Avolio (2003) and Avolio, et al., (2004) suggest that positive PsyCap is a personal resource of authentic leaders. A review paper by Gardner, Coglisier, Davis, and Dickens, (2011) also points out that POB states of PsyCap were originally included as qualities of an authentic leader. They note that high authentic leaders indeed have more positive states of PsyCap (e.g. Luthans, 2002; Luthans and Avolio, 2003; Gardner and Schermerhorn, 2004; Avolio and Gardner, 2005; Gardner et al., 2005; Jensen and Luthans, 2006; Luthans et al., 2007b). For example, Gardner and Schermerhorn (2004) note that authentic leaders not only possess positive psychological capabilities but also display it through their exemplary behaviour. Avolio and Gardner (2005) offer support that authentic leaders' positive PsyCap can enable them to clarify their followers' expectations and employ capable followers to perform their jobs, resulting in the leader's own development, the followers' development, and sustainable performance at organisational levels.

2.2.3.4 Developing follower PsyCap

Authentic leaders are aware of their values, beliefs, strengths, and weaknesses that guide and regulate their behaviour. They are future-oriented and concerned with the development of themselves and their followers (Luthans and Avolio, 2003). Via leading as an authentic role model, both authentic leaders and followers are shaped in their respective development (Gardner et al., 2005; Luthans and Avolio, 2003; Avolio and Gardner, 2005; Walumbwa,

Luthans, Avey, and Oke, 2011). Existing studies discuss the developmental themes that include two dimensions, authenticity and follower PsyCap.

1) Authenticity

Ilies et al., (2005) provide a theoretical explanation that authentic leaders will find themselves with authentic followers over time. They suggest that according to SLT (Bandura, 1977, 1986), learning could occur through both direct and vicarious experiences; hence, followers can acquire leadership characteristics, such as authenticity from observation (social learning). They suggest that followers tend to become similar to their leaders, because followers take on some characteristics of their supervisors via social learning (Ilies et al., 2005). Shamir and Eilam (2005) suggest that authentic leaders may use sharing a real life-story approach through which they explain their values, justify their vision, and provide the meaning system, serving as a more visible picture and acting as a source of information. As a result, followers can easily gain insight into the meanings attached to leaders' life events and how they identify in certain ways in their interaction with others. Followers can assess the degree of strength or weakness that the leader experiences, which provides cues for assessing the leader authenticity that serves as a model. Doing so contributes to the authenticity development of both leaders and followers, respectively (Gardner et al., 2005; Luthans and Avolio, 2003). Walumbwa et al., (2008) also report that authentic leaders can foster follower authenticity, resulting in positive self-development in the latter.

2) PsyCap

Theoretically, to reiterate, research notes that obtaining high PsyCap and developing followers is characteristic of an authentic leader (Gardner et al., 2005; Gardner and Schermerhorn, 2004; Walumbwa, et al., 2011), who focuses on building follower strength. High authentic leaders generally garner followers with more positive states of PsyCap (Clapp-Smith et al., 2009;

Gardner and Schermerhorn, 2004), which is also consistent with the need of development by restoring positive states in themselves and others (Gardner and Schermerhorn, 2004).

Consistent with assertions of Avolio et al., (2004) and Luthans and Avolio (2003), Gardner and Schermerhorn (2004) suggested that the ‘task of the authentic leader is to invigorate people with POB states’. Moreover, their work provides a guide to the underlying process concerning how authentic leaders influence each dimension of PsyCap states. Specifically, to build self-efficacy, leaders model verbal expressions of confidence, enactive mastery, vicarious learning, verbal persuasion, and managing physiological states to help followers recognize their own capabilities, which in turn will allow them to develop their self-efficacy. To create hope, they manage willpower and waypower; set specific stretch goals and help employees with ‘re-goaling’ skills, assist them in building feelings of competency and self-efficacy to improve their willpower, and allow them to participate in goal setting and commitment in pursuing specific goals to improve their waypower. To raise optimism, they foster followers’ positive emotional states and shift pessimistic attributions toward optimistic ones by helping them identify cases of adversity, including cause and consequence. To strengthen resilience, authentic leaders provide necessary support for their followers’ recovery from adversity or high levels of positive change, and make contingency plans in case of future potential adversity. Gardner and Schermerhorn (2004) point out that positive emotion displayed in role modelling can lead to developing PsyCap (e.g. self-efficacy and optimism).

Empirical studies also support that authentic leaders foster their followers’ PsyCap. Eid et al., (2012), using samples from the safety industry, report that authentic leaders instilled positive PsyCap states through their role modelling behaviour, which in turn influenced followers’ safety-focused behaviour. Rego et al., (2012) also support the notion that authentic leaders will

cultivate employees with more positive PsyCap states, although they did exclude self-efficacy as a PsyCap dimension.

2.2.4 Consequences of authentic leadership

Much research attention has been devoted to authentic leadership's effectiveness, which has been studied theoretically and empirically (see Table 2–2). According to Gardner et al., (2011), direct outcomes resulting from authentic leadership include: personal and social/organisational identification, positive leader's role modelling, trust in leadership, follower creativity, well-being, job satisfaction, organisational commitment, work engagement, and job performance. For instance, early theoretical studies (e.g. Avolio et al., 2004; Ilies et al., 2005) proposed a positive relationship between authentic leadership and follower's identification with his/her supervisor. Empirical studies (e.g. Walumbwa, Wang, Wang, Schaubroeck, and Avolio, 2010b) also provide supportive results. Trust in leadership was proposed as an outcome of authentic leadership (Avolio et al., 2004; Gardner et al., 2009; Gardner et al., 2005; Clapp-Smith et al., 2009). Indirect outcomes of authentic leadership, through its extensions, have also been reviewed by Gardner et al., (2011). These indirect outcomes of authentic leadership include: transformational leadership, satisfaction with one's supervisor, OCB, follower empowerment, and firm financial performance. For instance, Walumbwa et al., (2008) propose that authentic leadership has a significant positive relation with followers' satisfaction towards their supervisor, organisational commitment, and willingness to execute OCB. Clapp-Smith et al., (2009) indicate the existence of a positive relationship from authentic leadership to firm financial performance through the mediator of trust in the leader. Walumbwa et al., (2010b), using a sample of 387 employees reporting to 129 supervisors in two telecom firms in China, find that authentic leadership is a significant positive predictor of followers' OCB and work engagement. A study by Peus et al., (2012) empirically examines the outcomes of authentic

leadership and findings show a positive relationship from authentic leadership to followers' satisfaction with supervisor, organisational commitment, extra effort, and team effectiveness, but through a mediator of perceived predictability of the leader, which is one construct of trust.

The effective authentic leadership has been also examined at team level. A recent study by Hmieleski, Cole, and Baron, (2012), using a sample of 181 CEOs with an average age of 48 years in the USA, report that authentic leadership has positive effect on firm performance measured with one-year lagged revenue and employment growth, but through a mediator of positive affective tone of the team.

Table 2–2: Summary of research on consequences of AL

Variable	Source	Theoretical versus empirical	Explanations
Follower Positive emotions	Ilies et al., 2005	Theoretical	Emotion contagion
	Avolio et al., 2004	Theoretical	Logical
Role model	Ilies et al., 2005	Theoretical	Social learning
	Shamir and Eilam, 2005		
	Gardner et al., 2005	Theoretical	
	Avolio et al., 2004	Theoretical	
	Eid et al., 2012	Theoretical	
Follower PsyCap	Eid et al., 2012	Theoretical	
	Gardner and Schermerhorn, 2004		
	Rego et al., 2012	Empirical	Self-fulfilling prophecy
	Walumbwa et al., 2011		Positive emotions
	Eid et al., 2012		AL characters
Follower wellbeing Engagement	Gardner et al., 2005	Theoretical	Contagion
	Ilies et al., 2005		
	Shamir and Eilam, 2005		
	Avolio et al., 2004	Theoretical	
	Gardner and Schermerhorn, 2004	Theoretical	
	Yammarino et al., 2008		
OCB	Walumbwa et al., 2008;2010b	Empirical	
Work performance	Walumbwa et al., 2008	Empirical	
Firm finance performance	Clapp-Smith et al., 2009		

2.2.4.1 Authentic leadership and follower PsyCap

Increasingly, more studies have provided theoretical frameworks on how authentic leaders could develop follower's PsyCap, but empirical studies remain limited. For instance, Gardner and Schermerhorn (2004) provide a theoretical framework on how authentic leaders could develop followers' PsyCap by building their self-efficacy (e.g. pointing out success to build on strengths), fostering hope (e.g. designing challenging but reachable goals, identifying alternative pathways and resources), and raising optimism and strengthening resilience (e.g. addressing setbacks factually). Eid et al., (2012), using samples from the safety industry, report

that authentic leaders instilled positive PsyCap states through their role modelling behaviour, which in turn influences followers' safety-focused behaviour. Rego et al., (2012), using a sample of 201 employees' ratings of their PsyCap and their supervisors' authentic leadership abilities, report a positive relationship between authentic leadership and follower PsyCap, although they exclude self-efficacy as a PsyCap dimension. Walumbwa et al., (2011), using a sample of 146 intact groups from the financial industry, report a significant positive relationship between authentic leadership and team PsyCap.

2.2.4.2 Authentic leadership and role modelling

The study found that the relationship between authentic leadership and role modelling has not been examined empirically, although a few studies expect a possible relationship between them. For example, it is suggested that leaders, as ethical role models, should support their followers' growth and development (e.g. Gardner et al., 2005; Gardner and Schermerhorn, 2004; Ilies et al., 2005). For example, Gardner et al., (2005) suggest: 'Positive modelling is viewed as a primary means whereby leaders develop authentic followers' and 'as a positive role model, authentic leaders serve as a key input for the development of authentic followers'. Ilies et al., (2005) note that leaders serve as positive behavioural models for personally expressive and authentic behaviours. Walumbwa et al., (2008) report the effectiveness of authentic leadership in followers' satisfaction towards supervisor, organisational commitment, and a willingness to execute OCB. Towards a practical implication, they suggest that role modelling might be the best way to become an effective, trustworthy leader.

2.2.4.3 Authentic leadership and positive emotions

Thus, similar to the literature concerning the effectiveness of authentic leadership on role modelling, this study finds the relationship between authentic leadership and positive emotion

has not been examined empirically. Few studies expect a possible relationship between them. For instance, Avolio et al., (2004) report that positive emotions are important for authentic leaders to use in influencing their followers, because they represent valuable information about the dynamic transactions occurring inside workplaces. They claim that authentic leaders can create positive emotions among followers through identifying both personally and socially. Ilies et al., (2005) suggest that authentic leaders create an atmosphere conducive to experiencing positive emotions, because their own positive emotions influence followers' experiences. Gardner et al., (2005) suggest that authentic leaders impart positive emotions through role modelling for followers to emulate, grow, and develop. Recognizing both the fleeting character of positive emotion and that it would be difficult to measure, the study does not aim to investigate the relationship between authentic leadership and positive emotions.

2.3 Role modelling

2.3.1 Role modelling in nonbusiness settings

The term *role model* generally refers to a person who can potentially influence other individuals' behaviours, either directly or indirectly (Bandura, 1977, 1986). Role modelling has been widely researched in nonbusiness settings, particular in adolescents (Gavish, Shoham, and Ruvio, 2010; Kirby, 2009). According to the definition of role modelling by Bandura (1977) as discussed above, role models can encompass anyone from the focal person's immediate environment, such as parents, teachers, friends, sportsman, and peers. According to a literature review conducted by Kirby (2009), role models tend to change over time. For instance, parents are seen as original role models early in life (Clark, Martin, and Bush, 2001; Davison, Cutting, and Birch, 2003; Glover, 1978; Vescio, Wilde, and Crosswhite, 2005). At school, teachers are seen as role models (Casey, Eime, Payne, and Harvey, 2009; Glover, 1978; Spencer, 1998), because they can influence students, consciously and unconsciously, by their actions and appearance.

During adolescence, although parents and teachers may still be seen as role models, a range of other people may also be considered in that capacity, including athletes (Lockwood and Kunda, 1997), film stars (King and Multon, 1996; Lockwood and Kunda, 1997), as well as peers (Gavish et al., 2010; Horne, Tapper, Lowe, Hardman, Jackson, and Woolner, 2004; Horne, Hardman, Lowe, and Rowlands, 2009).

The effects of role modelling have been substantially examined in nonbusiness settings, including consumer goals and attitudes of teenagers (e.g. Carlson, Walsh, Laczniak, and Grossbart, 1994), purchase behaviours (e.g. Martin and Bush, 2000), self-efficacy and personal aspirations (e.g. Parker and Lord, 1993), marketplace knowledge (e.g. prices, stores, and products), or competencies (e.g. Brown and Mann, 1991; Bush, Martin, and Clark, 2001; Clark et al., 2001). Previous studies (e.g. Bush et al., 2001; Gavish et al., 2010; Kirby, 2009) used the SLT by Bandura (1977, 1986) to underpin role modelling, which suggests that people learn new behaviour and skills from observing others, termed ‘modelling’. For instance, Bush et al., (2001) used a sample of 175 teenagers to test the effects of role modelling. Their findings show that vicarious role models (e.g. mothers, fathers, and teachers) have an impact on teenagers’ purchasing behaviours and marketplace knowledge. They utilized SLT to explain the reasons that individuals gain their knowledge and developed their behaviours through contact with a variety of diverse influences (Bush et al., 2001, p. 28).

Kirby (2009) notes that the impact of role modelling could be both positive and negative. For instance, Spencer (1998) found role modelling’s impact is positive when teachers are responsible, credible, competent, and show respect to their students. Spencer (1998) and Casey et al., 2009 report that adolescent girls identified male physical education (PE) teachers as

potentially negative role models if male PE teachers are too competitive and advocate a ‘no pain, no gain’ stance.

2.3.2 Role modelling in business settings

The concept of role modelling was first identified as leadership behaviour in House’s (1977) theory of charismatic leadership. According to House (1977 p. 194), successful leaders ‘express, by their actions, a set of values and beliefs to which they want their followers to subscribe. That is, the leader “role models” a value system for the followers’. Role modelling represents the expectation leaders’ direct towards their follower for them to subscribe (House, 1977). The most effective leaders are believed to behave as role models who act in a manner consistent with the organisation’s goals and objectives. A follower likely emulates the leader’s behaviour if s/he regards the leader favourably.

2.3.2.1 Leader as a role model for employees

In workplaces, any leaders may be considered as role models, because leadership involves influence. ‘House (1977), Bass (1985, 1998), and Kouzes and Posner (1987) have all referred to role modelling as essential leader behaviour’ (Brown, Treviño, and Harrison, 2005). Role modelling behaviour has been widely studied in the literature of ethical leadership (e.g. Brown et al., 2005), transformational leadership (e.g. Avolio et al., 1999), and charismatic leadership (e.g. Conger and Kanungo, 1987). For example, Bass (1985, p. 77) suggests an inspirational leader influences employees to ‘the extent the leader provides examples and patterns for the follower’. Conger and Kanungo (1998, p. 479) note charismatic leadership impacts employees, for example: ‘A supervisor’s exemplary behaviours empower subordinates to believe that they can behave in a like manner’. Conger and Kanungo (1987, pp. 641–642) suggest effective leaders ‘engage in exemplary acts that followers perceive as involving great personal risk, cost, and energy’ and that are ‘worthy of imitation’. Kouzes and Posner (1987, p. 12) suggest that

‘managers may speak eloquently about vision and values, but if their behaviour is not consistent with their stated beliefs, people ultimately will lose respect for them’ and they identified ‘modelling the way’ as an effective process through which leaders exert influence on their employees.

The impact of ‘role modelling’, as a source of leader influence, is reported in sales management. For example, Rich (1997), using a total sample of 183 salespeople–manager dyads from 10 different American companies, reports that salespeople’s job satisfaction and performance are related to the perception of their sales managers’ role modelling behaviour. He suggested that *role modelling is essential* and sales managers must proactively set positive examples through their own actions, because ‘salespeople tend to emulate the work habits, positive attitudes, and goals of their managers and are less likely to go the “extra mile” if their supervisors are not willing to do the same’ (Rich, 1997, p. 319).

2.3.2.2 Impacts of authentic leaders’ role modelling

Research on authentic leaders’ role modelling behaviour has been also studied in recent years. Ilies et al., (2005) suggest that leaders serve as positive behavioural models for personally expressive and authentic behaviours. Avolio and Gardner (2005) suggest that authentic leaders are more likely to serve as role models, displaying consistency in word and deed, in line with their core values. They explain that authentic leaders’ role modelling behaviour is driven by a concern to foster followers’ development, which is one of the characteristics of authentic leadership.

The impacts of authentic leaders’ role modelling also have been studied conceptually in recent years. Conceptual works on authentic leaders’ role modelling suggest that such behaviour

affects their followers' growth and development (e.g. Gardner et al., 2005; Gardner and Schermerhorn, 2004; Luthans and Avolio, 2003), and employees become authentic (e.g. Friedman and Lobel, 2003; Gardner et al., 2005). For example, Gardner et al., (2005, p. 343) suggest that 'positive modelling is viewed as a primary means whereby leaders develop authentic followers' and 'as a positive role model, authentic leaders serve as a key input for the development of authentic followers'. The conceptual study by Friedman and Lobel (2003) is aimed at a particular career group, workaholic but authentic executives. They propose that employees viewed workaholic but authentic executives as role models because of their credibility, fulfilling being true to themselves and their actions being in accord with their values. As a result, employees learn authenticity from the role modelling, enabling them to become more open and passionate, learn and grow, and be more productive (Kahn, 1990). In an organisational setting, Weiss (1978) provides an example of how subordinates take on the characteristics of their supervisors via social learning mechanisms. He found that the amount of similarity in leadership style between supervisors and subordinates was a function of subordinates' perceptions of supervisors' success and competence. This suggests that leaders can serve as role models (and are likely to be imitated) to the extent they are viewed positively by followers. This view is reflected in empirical work. For instance, the study by Walumbwa et al., (2010b) report that authentic leaders promote extra-role behaviours (OCB) from followers through a mediator of identification and empowerment. They explain that authentic leaders' role modelling plays an important role in followers' influence. However, they did not measure the influence of role modelling in their study. To our knowledge, examining the impacts of authentic leaders' role modelling is still at the conceptual level and has not been empirically tested thus far.

2.3.2.3 Theoretical perspective

As did previous studies examining role modelling in nonbusiness settings, **SLT** by Bandura (1977, 1986) is used in business settings to explain how leaders influence their employees via role modelling. For instance, Brown et al., (2005, p. 120) propose that ‘ethical leaders become social learning models’ through which employees learn what behaviour is expected. In the same study (p. 123), they suggest that ‘ethical leaders are legitimate and attractive models who gain and hold followers’ attention and can therefore influence them more effectively’.

However, does a leader’s role modelling behaviour truly guarantee that a follower willingly will view a leader as a role model? In response, the study examines to what extent followers perceive a leader as role model and how this perception then influences their PsyCap. Therefore, the study intends to test a leader’s role modelling from a follower’s aspect. The variable of a leader’s role modelling concerns two aspects: firstly, whether the leader acts as a role model; and secondly, to what extent such role modelling the follower perceives and then is influenced by.

2.4 PsyCap

2.4.1 Four components of PsyCap

PsyCap refers to ‘an individual’s positive psychological state of development that is characterised by: 1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; 2) making a positive attribution (optimism) about succeeding now and in the future; 3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and 4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success’ (Luthans, 2002a, 2002b; Luthans, 2007).

Four subdimensions conceptualize the concept of PsyCap: hope, self-efficacy, optimism, and resilience. Hope refers to ‘a positive motivational state that is based on an interactively derived sense of successful (1) agency (goal-directed energy) and (2) pathways (planning to meet goals)’ (Snyder, 2002; Snyder, Irving, and Anderson, 1991). Building on Bandura’s (1986, 1997) social cognitive theory and extensive empirical research, self-efficacy was defined for the workplace by Stajkovic and Luthans (1998) as ‘the employee’s conviction or confidence about his or her abilities to mobilize the motivation, cognitive resources, or courses of action needed to successfully execute a specific task within a given context’; with regard to optimism, a widely used definition is associated with the work of Martin Seligman, the recognized pioneer of the positive psychology movement (Luthans and Youssef, 2007a). Optimists are characterised by an attribution style that explains good things through internal and permanent causes and bad things through external and temporary ones. Attribution theory was developed by Heider (1958) and Kelly (1971), and it studies peoples’ perceptions, that is, how people understand and explain the causes of actions. There are two distinctive patterns in attribution

style, internal causality and external causality. The former refers to positive events, such as success or promotions as the result of internal factors, such as superior skills and knowledge. The latter occurs with reference to external or environmental factors, such as luck or coincidence. The perception of the causality of events influences peoples' behaviour accordingly. For instance, Burns and Seligman (1989) suggest the explanation style can influence motivation, mood, and even the ability to perform a task. Unlike the traditional but general concept of resiliency, as a state it can only be observed and investigated with people who have exceptional experience; the POB aspect on resilience is that it is a learnable capacity that can be developed in ordinary people (Masten, 2001). Applying it to the workplace, resilience would be defined as a 'positive psychological capacity to bounce back from adversity, uncertainty, conflict, failure, or even positive change, progress, and increased responsibility' (Luthans, 2002a). Key characteristics of the four PsyCap dimensions are summarized in the following Table 2–3.

Table 2–3: Summary of key characteristics of the four PsyCap dimensions

	Hope	Self-efficacy	Optimism	Resilience	PsyCap
Definition	Snyder et al., 1991	Bandura 1997 stajkovic and Luthans, 1998. p66	Carver and Scheier 2002 Seligman and Schulman 1986	Luthans 2002a	Luthans, Avolio et al., 2007; Luthans and Youssef, 2004; Luthans, Youssef et al., 2007
Characteristics	To succeed Perseverant Goal- directed energetic will/path powerful Plan/path contingent	To succeed Confident Self recognition/ Achievement Take on/put in efforts	To succeed Positive attribution; Realistic flexible	To succeed Sustainable Persistent Endure Bounce back Coping	Interactive complementary synergistic effects

PsyCap thus offers a new source of competitive advantages subsequent to traditional, well-recognized resources, such as economic capital (e.g. money), human capital (e.g. knowledge, skills, and experience), and social capital (e.g. relations, networks). The reason for choosing the combination of hope, self-efficacy, optimism, and resilience to represent PsyCap is that the four components best meet the POB criteria (Luthans, 2002b; Luthans and Youssef, 2004, 2007), measurable, open to develop, and effectively managed for performance improvement.

2.4.2 Research on single components of PsyCap

2.4.2.1 In nonbusiness settings

As noted, this section reviews the literature covering one of the constructs of the PsyCap, leaving the literature combining two or more of the constructs to be reviewed in the next section. For four decades, many conceptual frameworks concerning hope, self-efficacy, optimism, and resilience have been widely proposed in various domains, such as health area (e.g. clinical, illness, and treatment), academia, and athletics. Research reveals that the positive state of hope helps people deal with difficulties more effectively (Paul, 2000; Snyder, et al., 2000), deal with physical or mental challenges more easily (Irving, Snyder, and Crowson 1998; Snyder, Feldman, Taylor, Schroeder, and Adams, 2000), and perform well in academic (e.g. Snyder, Shorey, Cheavens, Pulvers, Adams and Wiklund, 2002; Snyder, Wiklund, and Cheavens, 1999) and athletic activities (Curry and Snyder, 2000; Curry, Snyder, Cook, Ruby, and Rehm, 1997). Self-efficacy has also been examined in academic and athletic settings. Findings show self-efficacy is a predictor of general academic and mathematics capability (Hackett and Betz, 1989), reading skills (e.g. Schunk, 2003; Shell, Murphy, and Bruning, 1989), writing skills (e.g. Schunk, 2003; Schunk and Swartz, 1993; Shell et al., 1989), as well as other academic achievements (Zimmerman, 2000; Chemers, Hu, and Garcia, 2001) and athletic achievements (e.g. Pajares and Miller, 1994). In addition, self-efficacy has been found to play a

central role in smoking cessation (Gwaltney, Metrik, ahler, and Shiffman, 2009) and in response to chronic pain (e.g. Sard á Nicholas, Asghari, and Pimenta, 2009). Similar to the studies on hope and self-efficacy, research finds optimism plays a predictive role in academic and athletic success (e.g. Peterson, 2000; Seligman, 1998). Optimism research has enjoyed a long tradition in clinical, anthropology, and psychology areas. In particular, optimism has been widely examined in relation to treating severe illness, such as that of cancer patients (Kurtz et al., 2008) and as it relates to coping strategies (Nes and Segerstrom, 2006). For instance, Kurtz, Kurtz, Given, and Given, (2008) find that cancer patients who were more optimistic reported fewer fatigue symptoms and less severe pain than those who felt pessimistic. Resilience research has emerged in the clinical arena, since the 1970s, particularly in the field of child psychopathology (Howard, Dryden, and Johnson,1999), and then has been extended to adults who not only had survived but also successfully managed to thrive after extreme tragedies in health and illness areas, such as AIDS patients (Griffin and Rabkin, 1998; Rabkin, Remien, Katoff,and Williams, 1993), cancer survivors (Rowland and Baker, 2005), and survivors of the September 11 attacks (Butler et al., 2005). Findings reveal resilient children were able to overcome stressful experiences without being disrupted by various disadvantageous conditions, such as of parents suffering with mental illness or through domestic violence (Garmezy, Masten, and Tellegen,1984); Grych, Jouriles, Swank, McDonald, and Norwood, 2000; Masten, 2001), whereas highly resilient adults can effectively manage, adjust, and develop under a variety of life-threatening conditions.

2.4.2.2 In business settings

Only in recent years have studies on single components of PsyCap emerged concerning the workplace. Studies on theory building and empirical studies on workplace performance and the impact of hope have been published in the last decade (Luthans and Youssef, 2007b). Empirical studies (e.g. Peterson and Luthans, 2003; Larson and Luthans, 2006; Peterson and Byron, 2008)

have examined the single construct of hope in workplaces with adult employees, and findings indicate that hope is positively related to workplace performance. For instance, Peterson and Byron (2008) tested the consequences of hope by using 3 different samples of employees from different occupations and different industries, namely, 163 sales associates from retail sales, 79 mortgage brokers from mortgage brokerages, and 65 management executives working in the United States. They find more hopeful employees delivered better job performance measured with archived data on performance. Further, based on 76 management executives in a Fortune 100 financial services company, they explored how performance was enhanced by hopeful leaders. Findings reveal more hopeful leaders produced more and higher quality solutions to problems during work. Another study (Peterson, 2003) finds, based on 59 fast-food store managers, that the score of leaders' hope correlated with job satisfaction and retention of their employees, and profitability of their unit.

Among the four components, self-efficacy research has both the longest history and the most extensive empirical support in workplace settings (Luthans and Youssef, 2007a). From the research domain perspective, self-efficacy study covers general self-efficacy on work-related outcomes (Peterson and Byron 2008), career choice efficacy (Zeldin, Britner, and Pajares, 2008), entrepreneurial efficacy (Luthans and Ibrayeva, 2006), creativity (Tierney and Farmer, 2002), releasing work-stress efficacy (Schaubroeck and Merritt, 1997), and specific self-efficacy, such as managerial or leadership self-efficacy (Robertson and Sadri, 1993). From the review or meta-analytical aspect (e.g. Girst, 1987; Sadri and Robertson, 1993; Judge and Bono, 2001; Judge, Erez, Bono, and Thoresen, 2002; Stajkovic and Luthans, 1998), numerous studies have examined self-efficacy's role in predicting to job performance, job satisfaction, organisational commitment, and even intention to quit. For example, Stajkovic and Luthans (1998) provide evidence that self-efficacy is strongly associated with work-related performance,

after reviewing 114 studies with 21,616 samples in a meta-analysis. Specifically, according to O'Neill and Mone (1998), based on data from 242 employees in a healthcare firm, higher self-efficacy employees experience higher job satisfaction and a lower intention to quit.

Since the 1980s, optimism research has been associated with positive outcomes in workplaces, including job performance, job satisfaction, and a coping approach to eliminate workplace stress. For instance, Seligman and Schulman (1986) studied insurance sales agents and find support that positive optimism, due to its constructive explanatory style, can lead to high-optimism individuals with higher productivity and a lower intention to quit than their more pessimistic counterparts. Schulman (1999) also provides a conceptual explanation that optimistic expectations could result in a significant and positive influence on increasing sales productivity.

Exploratory resilience research in business is still very rare. Resilience research in workplaces remains in the exploratory stage, asking how it works and where it fits in the business context (e.g. Bonanno, 2004; Coutu, 2002; Dyer and McGuinness, 1996; Masten, 2001). For example, Masten (2001) notes resilience can be generated from the everyday magic of the ordinary. This is because people possess effective adaptation mechanisms that allow them to gain strength from their experience thus flexibly improvise in response to unexpected situations. Coutu (2002) suggests that resilience can be produced in terms of accepting and facing down reality, finding meaning in aspects of work and life, and improving one's improvisational ability. McAllister and McKinnon (2009), based on a review of the resilience literature, suggest the techniques to be resilience can be learned in school. However, thus far, no empirical study showing the implication of resilience in the workplace has been produced. In sum, as pointed out in meta-analysis by Avey et al., 2011b, each component's impact of PsyCap has been studied and

research published in considerable articles, with contemporary research attention having shifted to the aggregation of the components as a core construct.

2.4.3 Synergistic effects: four components of PsyCap

Subdimensional studies of PsyCap, that is, investigating the relationship between the individual construct of PsyCap with workplace performance continues. In the meantime, it is found conceptually and empirically that although each dimension is independent, a common, underlying link joins them (Luthans et al., 2007b), and changing one tends to change the others (Magaletta and Oliver, 1999; Judith, 2006). Overlap is found among the four components, for example, Bandura (1997, p. 3) concludes that those high in self-efficacy will be more resilient to adversity, and Snyder (2000, p. 39–40) notes that those high in hope tend to be more confident when working on specific tasks (self-efficacy) and are quickly able to bounce back (resilience) after a temporary hopeless period. Philip et al., (1999) used 204 university student samples and also finds overlap among hope, self-efficacy, and optimism. Further, findings show that PsyCap creates synergetic effects. For example, when Luthans (2002a;2002b) first addressed the combination of the four PsyCap dimensions as a higher-order construct, he conceptually indicated the combination of the effect of these four shall be greater than the effect of any individual construct. Subsequent studies reveal that employees' level of PsyCap has a relatively stronger relationship to their performance and job satisfaction than any single facet of hope, self-efficacy, optimism, or resilience (Luthans, Avolio, Avey, and Norman, 2007a). In addition, if introducing micro intervention to participants, the result of the whole construct is greater than the sum of the four components (Luthans et al., 2006).

Conceptually, overall, PsyCap should be able to contribute to performance, since each of its subdimensions does. Therefore, due to interactive relations among the subdimensions of PsyCap and consequent synergistic effects on work-related outcomes, the constructs of PsyCap

will be examined as a whole construct in this study. Moreover, the study will also presume that changing one of the subdimensions of PsyCap will result in positive impacts on the others.

2.4.4 Antecedents of PsyCap

Certain **factors** have been found to play key roles in determining follower PsyCap: transformational leadership (Gooty et al., 2009; McMurray et al., 2010), authentic leadership (Rego et al., 2012; Walumbwa et al., 2011), leader PsyCap (Avey, Avolio, and Luthans, 2011a; Walumbwa, Peterson, Avolio, and Hartnell, 2010a), employees' previous PsyCap (Luthans et al., 2011; Peterson et al., 2011), and a supportive organisational climate (Rhoades, Eisenberger et al., 2001).

2.4.4.1 Leadership and PsyCap

According to Gardner et al., (2005), authentic leadership means the leader owns his or her inner thoughts, values, and beliefs, and acts in a way that reflects the true self. Researchers (Gardner et al., 2005; Gardner and Schermerhorn, 2004) note that having high PsyCap and developing followers is characteristic of an authentic leader. Supervisors' PsyCap serves as an effective predictor of how their authentic leadership will be perceived by others. Empirical evidence provided by Jensen and Luthans (2006) test the relationship between entrepreneurs' PsyCap and authentic leadership, and finds the higher the entrepreneurs' PsyCap, the higher their authentic leadership is perceived by employees.

Theoretical and empirical studies also report that transformational leadership serves as an antecedent of leaders' PsyCap. For instance, Gooty, Johnson, Frazier, and Snow, 2009 pursue a theoretical model and report that followers' perception of transformational leadership is an antecedent to leaders' PsyCap, which in turn leads to positive outcomes. An empirical study by Peterson, Walumbwa, Byron, and Myrowitz, 2009 find that both CEO's PsyCap and their

transformational leadership contribute to organisational performance; moreover, leaders' PsyCap mediated the relationship between transformational leadership and their firms' performance. This demonstrates that the higher the leaders PsyCap, the greater the perception of transformational leadership.

2.4.4.2 Supportive organisational climate and follower PsyCap

A supportive organisational climate refers to the overall amount of perceived support employees receive from peers, supervisor, other departments, and the organisation (e.g. company value, HR system), along with which elements they view as helping them successfully perform their work duties (Rhoades, Eisenberger, and Armeli, 2001). Previous evidence supports the view that the support an employee receives is directly related to outcomes, such as performance and job satisfaction (e.g. Saks, 2006), organisational outcomes such as organisational commitment (Rhoades et al., 2001), and customer satisfaction (Rogg, Schmidt, Shull, and Schmitt, 2001).

This study found one empirical study by Luthans et al., (2008c) examines the relationship between supportive organisational climate and employees' PsyCap. Using different samples in three studies, which included 404 university students, 163 insurance workers, and 288 engineers and technicians, they test how a supportive organisational climate contributes to employees' performance (e.g. work performance, job satisfaction, and organisational commitment). Their findings show PsyCap plays an important mediating role linking the organisational climate and employee performance.

2.4.4.3 Leader PsyCap and follower PsyCap

The study found a few empirical studies have examined the relationship between leader–follower PsyCap. Further, no theoretical research provides explanations to link these two

variables. A few other studies have reported evidence contradicting these hypotheses. Avey et al., 2011a, using a sample of 106 engineers from an aerospace firm, find that leaders' PsyCap is positively associated with followers' PsyCap. They suggested that positive capacities (e.g. PsyCap) displayed by leaders affects their followers, which in turn influence their work performance. Walumbwa et al., (2010b), using data from a sample of 79 police leaders and their direct reports (264 police officers) from the United States, report a positive relationship between leader and follower PsyCap. Hodges (2010) conducted preliminary experiments in a financial service firm in the United States and tried to test the relationship using a sample consisting of 52 managers and 152 employees in the control group and 58 managers and 239 employees in the treatment group, but no supporting results were reported after introducing PCI training. He argues this might result from a ceiling effect in most of the variables, explaining when variables already have a high rating, improving them to a significantly higher level is difficult. Nonetheless, he admits the examination may have failed, as his focus was not specifically on training managers.

2.4.5 Consequences of PsyCap

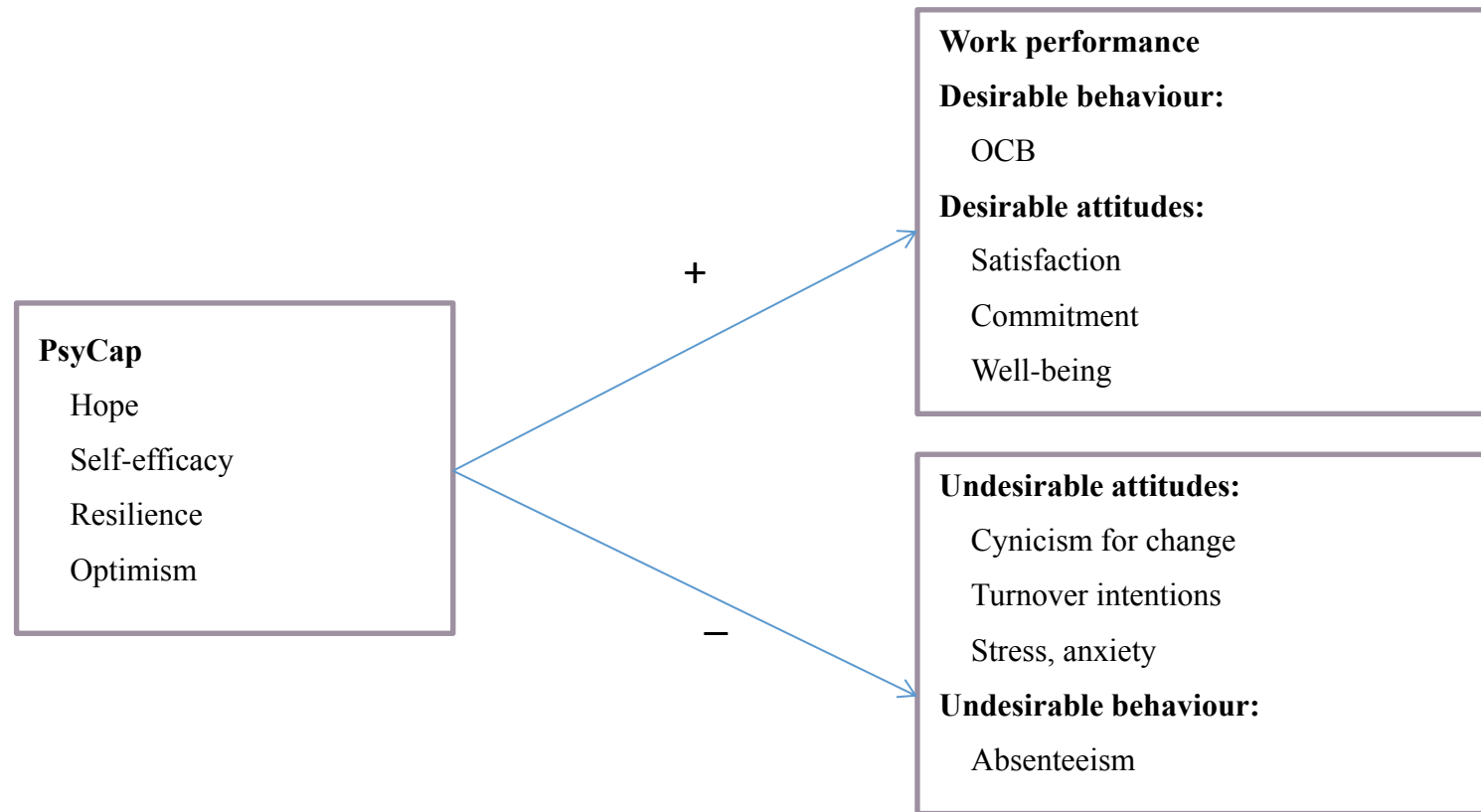
There have been both theoretical and empirical studies (see Table 2–4) examining PsyCap's effects (see Figure 2–1) by comparing it with other resources, such as demographic resources, human capital and social capital, and economic resources. For instance, in two PsyCap studies conducted in a Chinese factory using workers as samples, findings indicate the impact of individuals' PsyCap on their work performance is greater than that offered by demographic resources, for example, 7% in a study by Luthans et al., (2008a) and 10% in study by Luthans et al., (2005). Luthans et al., (2005), using a sample of 422 workers in 3 Chinese factories, finds PsyCap accounted for a difference of 7% to 10% in work performance, regardless of supervisor rating, self-reporting, or even merit-based salaried overtime. Demographic factors (e.g. age, gender, education, and tenure) only explained 1% of the variance in work performance, as rated

by supervisors. Research by Larson and Luthans (2006), using a sample of 74 factory workers, reports an important finding that factories workers' PsyCap had a significant added impact over their human capital (e.g. education, service tenure), social capital (e.g. workplace social inclusion), and work attitudes, as measured by organisational commitment and job satisfaction. In an interesting study by Luthans et al., (2006), they even calculate the potential economic return of PCI, based on a sample of 74 engineering managers. Their preliminary findings indicate a highly significant 270% financial return might be generated if the one-year PCI training investment is \$73,919.

Current research concerning PsyCap covers three perspectives: developable characteristics of PsyCap, consequences of PsyCap, and antecedents of PsyCap, with consequences of PsyCap attracting the most examination. A meta-analysis by Avey et al., (2011b) summarises the current crop of studies on PsyCap consequences related to employee attitudes, behaviours, and work performance. They find that 1) sample studies of desirable employee attitudes' impact include job satisfaction (Larson and Luthans, 2006; Luthans et al., 2005, 2007a; Youssef and Luthans, 2007); organisational commitment (Luthans, et al., 2007a, 2008c; Youssef and Luthans, 2007); well-being (Avey, Luthans, Smith, and Palmer, 2010a; Culbertson, Fullagar, and Mills, 2010); and work engagement (Avey et al., 2008b; Xanthopoulou, Bakker, Demerouti, and Schaufeli, 2009); 2) sample studies of undesirable employee attitudes' impact include quit intention (Avey, Luthans, and Jensen, 2009); stress/anxiety (Avey et al., 2009); and cynicism (Avey et al., 2008b); 3) sample studies of desirable employee behaviours' impact include OCB (Avey et al., 2008b); 4) sample studies of undesirable employee behaviours' impact include deviance (Avey et al., 2008b); and 5) work performance improvement studies include multiple types of performance (e.g. task proficiency; sales): (Avey et al., 2010b; Peterson et al., 2011). Some other PsyCap impact studies that were not reviewed in the meta-analysis by Avey et al.,

(2011b) include voluntary and involuntary absenteeism (Avey, Patera, West, 2006); engagement (Avey et al., 2008b); and problem-solving and innovation (Luthans, Youssef, and Rawski, 2011).

Figure 2–1 Summary of variables constituting consequences of PsyCap



Sourced from Avey et al., (2011b, P.140)

2.4.5.1 Employee performance

Of all of the positive outcomes, work performance has been mostly extensively examined, with examining Chinese samples from Chinese factory workers (Luthans, et al., 2005; 2008), teller and franchisees from Australia banks (Avey et al., 2010c), financial services personnel (Peterson et al., 2011), and engineers (Luthans, et al., 2007a). For instance, on the one hand, Luthans et al., (2005) examined 422 workers from 3 Chinese factories, finding that PsyCap accounted for a difference of 7% to 10% in work performance, regardless of supervisor rating, self-reports, or even merit-based salaried overtime. On the other hand, they find demographic factors (e.g. age, gender, education, and tenure) explained only 1% of the variance in work performance, as rated by supervisors. Their follow-up investigation by Luthans et al., (2008a) on the same sample of Chinese workers, find this to be the case regarding Chinese workers' performance. Gooty et al., (2009) find PsyCap is directly related to work performance, measured according to sales growth. Using samples of 336 tellers and 109 franchisees from an Austrian bank, Avey et al., 2010c find PsyCap is directly related to work performance, with data rated by multiple sources (self-reports, manager rated performance, sales records). Youssef and Luthans (2007) and Luthans et al., (2007) find, overall, employees with a higher PsyCap demonstrate better work performance, measured by both self-reports and archived data on performance results. In addition, their findings indicate the combined effect of PsyCap's four components is greater than the sum of each individual component's effect on work performance.

2.4.5.2 Job satisfaction

Although PsyCap is primarily aimed at performance improvement, it has also been found to affect *job satisfaction*, as employees with higher PsyCap are more likely to feel satisfied with their job and their leaders. Larson and Luthans (2006), based on a sample of 74 manufacturing employees, find a significant relationship between PsyCap and job satisfaction. In addition,

previous evidence shows that each PsyCap component – hope (Peterson, 2003; Larson and Luthans, 2006), self-efficacy (O’Neill and Mone, 1998), optimism (Youssef and Luthans, 2007), and resilience (Larson and Luthans, 2006) – correlates with job satisfaction. Therefore, due to the nature of the higher order of PsyCap constructs, PsyCap shall predict job satisfaction above and beyond each of the components’ contribution to job satisfaction. Empirical examples support this notion. The Luthans et al., (2005) study on Chinese workers finds each of PsyCap’s four components has the same level of influence on job satisfaction, and the combined effect of all four has an even greater influence than any individual one. Using a cross-sectional design with a very large sample, studies in the United States by Youssef and Luthans (2007) and Luthans et al., (2007) also reveal that combining PsyCap components resulted in a stronger relationship with job satisfaction than did any one individual component.

2.4.5.3 Other consequences

Previous research provides evidence that PsyCap positively relates to OCB (Gooty et al., 2009). Avey et al., (2010b), using a sample of 336 working adults, suggest that high PsyCap individuals display greater OCB. They also report that high-PsyCap individuals display less intention to leave their jobs. Previous research also provides evidence demonstrating that PsyCap is negatively related to the intention to quit (Avey et al., 2008a, 2009, 2010a). There are few studies on the effects of PsyCap on work engagement. Xanthopoulou et al., (2009) use a sample of 42 employees from a fast-food company to study the relationship among personal resources (i.e. PsyCap components of self-efficacy and optimism), work engagement, and financial return. Their findings suggest these personal resources are positively associated with work engagement. A very recent study by Baron, Franklin, and Hmieleski, (2013), using a sample of 160 business founders, report that entrepreneurs’ PsyCap was negatively related to their stress, which in turn was negatively relate to their well-being.

Table 2–4: Summary of research on consequences of PsyCap

Title	Authors	Sample size	Informant	Context	PsyCap measure	Outcomes
The psychological capital of Chinese workers, exploring the relationship with performance	Luthans et al., 2005	422	workers in 3 factory	China	30-item	Work performance
Potential added value of psychological capital in predicting work attitudes	Larson and Luthans 2006	76	workers in small factory	USA	NA	Job satisfaction Organisational commitment Human capital; Social capital
Positive psychological capital: Measurement and relationship with performance and satisfaction	Luthans et al., 2007	N1=151 N2=114	S1 students S2, Engineers Insurance service	USA	12 -item	Work performance Job satisfaction Organisational commitment
Positive organisational behaviour in the workplace – the impact of hope, optimism, and resilience	Youssef and Luthans 2007	N1=1032 N2=232	Working adults from a variety of organizations	USA	32- item	Work performance Jobsatisfaction Organisational commitment Work happiness
Using positivity, transformational leadership and empowerment to combat employee negativity	Avey et al., 2008a	341	Working adults from a large Midwestern university	USA	24-item	Intentions to quit Employee cynicism
Can positive employees help positive organizational change? Impact of psychological capital and emotions on relevant attitudes and behaviors	Avey et al., 2008b	132	Working adults from a variety of organizations	USA	24-item	Engagement OCB Cynicism Deviance
More evidence on the value of Chinese workers' psychological capital: A potentially unlimited competitive resource?	Luthans et al., 2008a	456	worker in 3 factories	China	12-item	Work performance
The mediating role of psychological capital in the supportive organisational climate – employee performance relationship	Luthans et al., 2008c	s1 404 s2 163 s3 288	s1, student s2, servs3, eng. and tech.	USA	24-item	Work performance /Si/OC
Psychological capital: A positive resource for combating employee stress and turnover	Avey et al., 2009	416	Working adult across a variety of organisations	USA	24-item	Work performance Job satisfaction Job retention
The interactive effects of psychological capital and	Norman et al., 2009	199	Working adult across a	USA	12- item	Employee Deviance

organizational identity on employee organizational citizenship and deviance behaviors			variety of organisations			OCBO Identity with the Organisation
Work engagement and financial returns: A diary study on the role of job and personal resources	Xanthopoulou et al., 2009	42	Employees in fast-food firm	Grace	NA.	Work engagement Job satisfaction OCB Job retention
The additive value of positive psychological capital in predicting work attitudes and behaviors	Avey et al., 2010b	336	Working adult across a variety of organisations	USA	24-item	Intention to quit OCB counter productive work behaviours
Two field studies examining the association between positive psychological capital and employee performance.	Avey et al., 2010c	N1=345 N2=109	tellers franchisees in banks	Australia	24-item	Work performance
Impact of positive psychological capital on employee well-being over time	Avey et al., 2010a	280	adult	USA	24-item	Wellbeing
Psychological capital and employee performance: A latent growth modeling approach.	Peterson et al., 2011	179	Employees from retail advisory department of a finance service firm	USA	24-item	Work performance
Why Entrepreneurs Often Experience Low, Not High, Levels of Stress The Joint Effects of Selection and Psychological Capital	Baron et al., 2013	160	business founders	USA	12- item	Wellbeing Stress

2.5 Work competence

Work competence refers to ‘work related knowledge, skills, or ability’ (Wright et al., 2001, p. 712). Work competence indicates an individual’s demonstrated capacity to perform to satisfy the special requirements of a particular organisation. Work competence and job related skills for a particular job are inseparable (Sandberg 2000; Wright et al., 2001). This is because work competence is job-specific demands that cannot easily be applied outside the focal firm (Campbell et al., 2012; Luthans and Youssef, 2004). Work competence is not the general human capital that employees can take easily to alternative organisations when they leave (Campbell, Coff, and Kryscynski, 2012, p. 376–377). Due to its work inimitability, work competence is argued as a sustained competitive advantage.

2.5.1 Antecedents of work competence

Previous research has studied antecedents to work competence. For example, Ilies et al., (2005) suggest that leaders serve as positive behavioural models for personally expressive and authentic behaviours. Authentic leaders support followers’ self-determination by providing opportunities for skill development and autonomy. Explicitly, it is indicated authentic leadership can increase followers’ work competence via the process of role modelling.

Empirical evidence examining the relationship between employee PsyCap and work competence in fact already exists. For instance, Walumbwa et al., (2010a) report PsyCap is positively related to work competence, which is measured by four-item scale (e.g. immediate supervisor ratings of employees’ job competence, overall competence, work efficiency, and work quality). Although Walumbwa et al., (2010a) aim to examine the positive relationship between PsyCap and work performance, they used measure construct of work competence and the result support a positive relationship between PsyCap and work competence.

2.5.2 Work competence as a predictor of work performance

Work performance is the most widely studied variable in the literatures of both organisational behaviour and human resource management (Campbell, McHenry, and Wise, 1990). Work performance refers to the yield and outcome generated by individual employees at work. Task performance and extra-role behaviour (OCB), both contributing to organizational success, determines an individual's overall work performance. Task performance refers to an individual's accomplishment of work-related tasks, indicating how well, to a degree, an individual performs the job. Extra-role performance refers to individual's contextual performance of discretionary behaviours that go beyond their formal duties (Katz, 1964; Organ, 1988). Empirical evidence suggests that work performance involves both task performance and extra-role performance such as OCB. For instance, MacKenzie, Podsakoff, and Fetter, (1991, 1993) find sales representatives' overall job performance, as rated by their sales managers, was determined in equal measure by their actual sales and OCB.

Extant research uncovers multiple antecedents (e.g. personality, emotion, OCB, work competence) of employee performance. Researchers (e.g. Barrick and Mount, 1991; Judge and Bono, 2001; Mischel, 1977) acknowledge personality significantly impacts work performance. For example, Conscientiousness has the strongest impact on work performance, which has been found to be the case in employees from a variety of occupations and cultures.

Conscientiousness is characterised by working hard, persistence, self-discipline, and feeling a sense of responsibility, which leads to workplace outcomes. Amabile and Kramer (2007) proposed a theoretical model from the psychological aspect suggesting people perform better when their daily experience involves more positive emotions, strong intrinsic motivation, and favourable perceptions of their work. Not only individual differences and psychology matter but also socially contextual factors account for work performance. For instance, Campbell et al.,

1993 propose eight dimensions of work performance predictors: 1) job-specific task proficiency, 2) non-job-specific task proficiency, 3) written and oral communications, 4) demonstrating effort, 5) maintaining personal discipline, 6) facilitating peer and team performance, 7) supervision/leadership, and 8) management/administration.

It is generally agreed that work competence is a predictor of work performance (Campbell, McCloy, Oppler, and Sager 1993; Heilman, Block, and Stathatos, 1997; Sandberg 2000). Indeed, researchers argue that work competence as the capacities that exist within a person and which predict superior performance, plays a key role in worker's performance in today's rapidly changing workplace (Boyatzis, 1982; Spencer and Spencer 1993; Stajkovic, 2006). This is because individuals possess job-specific capabilities which enable them to adapt to change and make better use of the equipment and manipulate the environment in challenging tasks and thus perform better. As a result, employees with a high level of work competence generally perform better than do employees with a low level. According to Borman and Motorwidlo (1993, 1997), work performance is associated with individuals' KSAs and overall experience of know-how. This means it is believed that individuals' work competencies can predict their future task performance. McClelland (1998) report a positive relationship between work competence and work performance. In their study, they compare two groups of executives who received feedback on how well they meet various competences needed for their job. The feedback was given followed by the previous work performance appraisal belongs to the first group, and the feedback was given followed by the next work performance appraisal belongs to the second group. The first group perform better than the second group in the following year. Empirical evidence exist that work competence has been the measure of choice in predicting work performance in earlier studies (e.g. Walumbwa et al., 2008; 2010a).

2.6 OCB

OCB has been studied extensively for more than 30 years (Organ, Podsakoff, and MacKenzie, 2006; Podsakoff, MacKenzie, Moorman, and Fetter, 1990; Podsakoff, MacKenzie, Paine, and Bachrach, 2000). The definition of OCB varies. According to Organ (1988, p. 4), OCB refers to ‘individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organisation’. According to George and Brief (1992), OCB refers to the additional things not mandated to do but that people undertake to do that benefit the organisation. OCB includes such actions as helping colleagues or voluntarily taking on extra duties (Van Dyne, Graham, and Dienesch, 1994) and is characterised by volunteering to execute activities not formally part of the job; persisting with extra enthusiasm when necessary; helping and co-operating; adhering to organisational rules, even when personally inconvenient; and endorsing, supporting, and defending organisational objectives (Borman and Motorwidlo, 1993, 1997). OCB is characterised by punctuality, helpfulness, willingness to make suggestions for improvement, and not wasting time at work (Spector, 1997). Smith, Organ, and Near (1983) suggest that OCB is discretionary and helpful to improving organisational functioning but not directly recognized by an organisation’s formal reward system.

2.6.1 Antecedents of OCB

Antecedents to OCB include employees’ personality, positive attitudes, motivation (Organ and Ryan, 1995), leadership effectiveness (Podsakoff et al., 1990, 2000), and PsyCap (Avey, et al., 2010a; Gooty et al., 2009). Empirical studies support this viewpoint. For example, Ilies et al., (2006) propose that having a positive personality predicts the frequency and consistency of engaging in OCBs. Borman and Motorwidlo (1993, 1997) report that individuals with certain personality characteristics (e.g. conscientiousness) are willing to fulfil extra roles by supporting

others, thus displaying a higher level of OCB. Podsakoff et al., (2000) report OCB is related to different leadership styles, based on meta-analytic studies and suggest OCB is negatively related to directive leadership but positively with supportive leadership. In support of this view, Organ, Podsakoff, and MacKenzie (2006) find support for positive relations between supportive leadership and OCB. Specifically, transformational leadership (Podsakoff et al., 1990, 2000, 2006) and charismatic leadership (Deluga, 1995) promote OCB. In particular, transformational leadership has received much attention (Podsakoff et al., 2000). Meta-analytic reviews (e.g. Fuller, Patterson, Hester, and Stringer, 1996; Judge and Piccolo, 2004) offer a summary that transformational leadership promotes OCB; that is, transformational leaders make their organisations' missions salient and encourage followers to engage in OCB behaviour. As a result, employees working under a transformational leader become more willing to cooperate in making a positive contribution to the work context. Supporting this view, Podsakoff et al., (1990) argue 'the most important effects of transformational leaders should be on extra-role performance, rather than in-role performance' (p. 109). PsyCap can also predict OCB (Avey, et al., 2010b; Gooty et al., 2009). For example, Avey et al., (2010b), using a sample of 336 working adults, note that high PsyCap individuals display greater OCB.

2.6.2 Consequence of OCB

To increase competitiveness, organisations emphasize improving both formal employee job performance and extra roles of employees' performance, such as OCB performance (Farth et al., 1997). It is suggested that OCB, although largely discretionary, supports job performance by enhancing the psychological work environment (Wang et al., 2005), meaning OCB contributes to task performance. In support of this view, Podsakoff and MacKenzie (1994) find OCB has significant effects on sales unit performance, accounting for approximately 17% of the variance. Walz and Niehoff (1996) find OCB accounted for an average of about 29% of the variance in six objective measures of unit performance (operating efficiency, revenue to full-

time equivalent, food-cost percentage, customer satisfaction, customer complaints, and overall quality of performance) in limited-menu restaurants. Tsaur and Lin, 2004, using a sample of 203 employees and 272 customers in 42 different hotels in Taiwan, report that extra-role service behavior is positively related to work performance in service organizations.

2.7 Conclusion

This chapter discussed the theoretical frameworks in POB research that will be used to underpin my model, including social learning theory, emotion contagion and broaden-and-build theory, conservation of resource theory, goal setting theory, and social exchange theory. These theories are very useful because they have been widely adopted as explanatory mechanisms in POB studies. For example, Bandura's (1977, 1986, 1997) SLT has been used to explain the development of follower authenticity, the development of PsyCap, the effects of leader PsyCap on follower PsyCap, and role modelling's impacts on follower's performance. Emotion contagion theory (Schoenewolf, 1990) has been used in explaining the change of PsyCap over time and the transference of leader-follower PsyCap. BB theory (Fredrickson, 1998, 2001, 2003, 2009) has been used often to explain PsyCap's positive consequences, such as OCB and work performance. COR theory (Hobfoll, 1989, 2002; Wright and Hobfoll, 2004) has been used as a mechanism in the rationale explaining why employees are motivated to build up their PsyCap resources over time to attain successful future performance. SET (Blau, 1964) has been used to explain the rationale of employees in acquiring potentially available resources or undertaking extra-role behaviours (OCB) for extra benefits. This chapter also reviewed observed variables - authentic leadership, role modelling, PsyCap, work competence, and OCB and their key studies.

Chapter 3 : Procedures guiding PsyCap training

3.1 Guidelines on PsyCap training

Luthans et al., (2007b) originated the approach in developing PsyCap into a PCI training model (Figure 3–1), which suggests the intention of PCI training is to affect each PsyCap construct, including hope, self-efficacy, resilience, and optimism, after which the PsyCap level can be increased. Consequently, PCI's impacts can be predicted. This PCI model has been widely adapted in subsequent empirical PCI studies. To the best of my knowledge, all existing empirical PCI studies (e.g. Hodges, 2010, Luthans et al., 2006, 2008, 2010) followed this PCI model. According to the study, a couple of steps each aim at affecting one construct of PsyCap (see Figure 3–1). Setting goals is the first step, followed by identifying pathways and obstacle planning. These steps establish hope. Experiencing success and modelling others, and persuasion and arousal establish self-efficacy. Building efficacy and confidence, and developing positive expectancy increase optimism. Building assets and avoiding risks, and learning how to affect the influence process improves resilience. The details of the guidelines provided by Luthans et al., (2007b) are discussed below.

3.1.1 Hope development

The hope construct was determined by having reasonable goals, pathways, and willpower. Reasonable goals mean that the goals are personally valuable, relatively challenging but reachable, and have clear beginning and ending points. Pathways refer to influencing factors toward their goals, potential obstacles that might impact negatively on the accomplishment of targets, and solutions to prevent or overcome obstacles. Willpower refers to motivation to accomplish goals. Characteristics of reasonable goals and availability of pathways generated sustained motivation. Participants practiced setting goals and identifying pathways, thus generated their willpower. All these practices taken together increased the level of hope.

3.1.2 Efficacy development

Efficacy was influenced by a range of exercises, including encouraging direct mastery experience, vicarious learning, positive feedback, emotional arousal and social persuasion. Mastery experience indicates stepwise techniques and abilities that can be built up through individuals' direct practices and frequent replication. Vicarious learning refers to one type of social learning through which participants learn behaviour and skills by observing and imitating their peers. During the individual exercise, each participant received feedback from their peers regarding additional pathways to expect. On the other hand, peers' exemplary behaviour and successful stories aroused participants' internal motivation and can-do attitude. Thus, all of these practices taken together contribute to the development of efficacy.

3.1.3 Optimism Development

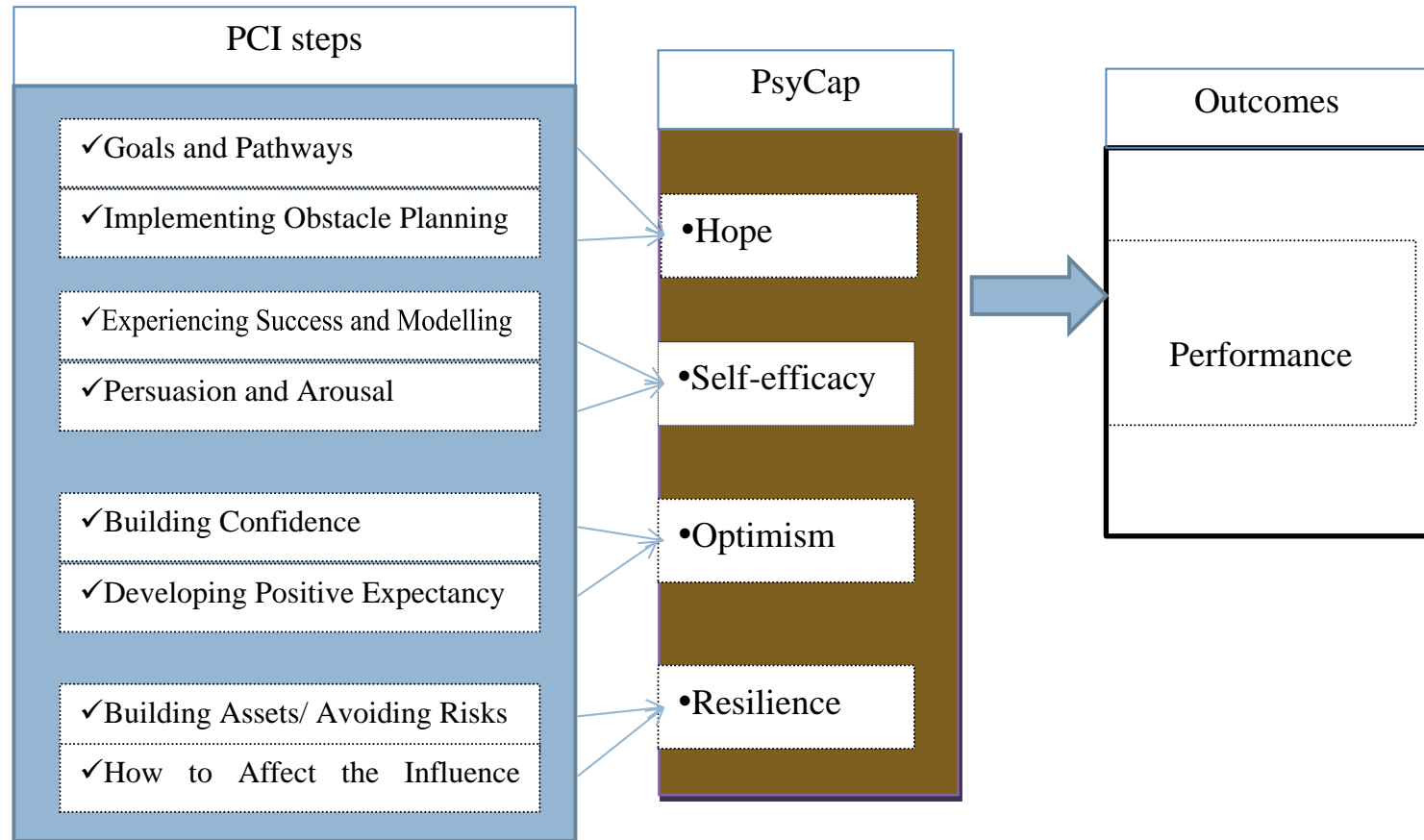
Optimism was influenced by positive attribution about succeeding now and in the future. Positive attribution means that an individual attributes causes of career success to internal and permanent situations rather than luck, and failure to external and unstable ones. The exercises of pathway and willpower generation, task mastery, vicarious learning, positive feedback, emotional arousal and social persuasion, likely generated positive expectations as individuals observed that their peers were also expecting and making plans for success. Further, these stages likely made participants attribute their peers' career success to their replication and mastery experience rather than luck. Therefore, positive expectation and positive attribution was generated from hope and efficacy exercises, in turn develops optimism.

3.1.4 Resilience development

Resilience was increased by building awareness of the conservation of personal assets in the form of talents, skills, and social networks. COR theory highlights the importance of motivation to acquire and invest in resources. One's ability to acquire and maintain resources is both a

means and an end – a means for meeting the current work demands thus achieving success, and an end that includes adapting, coping, and feeling well. Participants practiced the identification of a list of resources that they could leverage to accomplish a given goal. Similar to the obstacle planning exercise in the development of hope, participants practiced the identification of obstacles that could impede their acquirement of the necessary resource. Different from the hope exercise in which focus was given on making plans to overcome obstacles identified, in the resilience exercise, the focus was on building up feelings of confidence and resilient thoughts when facing adversity, by making proactive plans and getting resource available to eliminate risks and overcome adversity.

Figure 3–1 Guidelines on PCI training



Note: This intervention is intended to affect each state as well as the overall level of PsyCap.

Source: Adapted from, Luthans et al., 2006, 2007b, 2010.

3.2 Research on PCI studies

Investigations of PsyCap's developmental character have been conducted and have continued to be both theoretically and empirically examined ever since the initial PCI research by Luthans et al., 2006 was published. A review of the literature shows four empirical works most often cited by scholars and researchers. These works were analysed, and their related findings are listed below (Table 3–1). A typical experimental design requires that participants are randomly divided into two groups (see Section 5.6.2). One group receives intervention (treatment group), and the other one does not (control group). In this study, the treatment group who receives PsyCap intervention training is also named PCI group, and the control group also as NPCI group.

Table 3–1: Summary of research on PCI

Title	Author	Sample size	PCI	Control group	Informant	Outcomes
Psychological capital development: toward a micro-intervention (preliminary)	Luthans et al., 2006	NA NA	1H 2H/2.5H	Desert Survival	Student managers	3% PsyCap increase-student No details without introducing data analysis
Experimental analysis of a web-based training intervention to develop positive psychological capital	Luthans et al., 2008b	364 T187 C177	45M@2	Decision making	Working adult from a variety of firms	ΔPsyCap T 4.58-4.70; 2.6% C 4.69-4.64 1% ANOVA ANCOVA BESD
The development and resulting performance impact of positive psychological capital	Luthans, Avey et al., 2010	experimental design RCT 242 80	2H 2H	No control	Pilot_ student Main_ managers	ΔPsyCap Mgr 4.79 4.93; 4% ΔWP self R7.43-8.41; 13% Mgr R 7.66-8.20; 7% Paired-sample t-test ANCOVA BESD
An experimental study of the impact of psychological capital on performance, engagement and the contagion effect	Hodges, 2010	T58/239 C52/152 Online survey	3.5H 3batch	No control	Finance. service	Leader-follower PsyCap ΔPsyCap Mgr 5.33-5.35; 0.3% ΔWP Mgr: 8.29-8.24; 0.6% Mgr R 8.09-8.02; -0.8% ΔPsyCap Follow 5.08-5.10; 0.4% self R8.29-8.34; 0.6% Mgr R 7.44- 7.57; 1.7% ANOVA

Firstly, the Luthans et al., (2006) study – in which a one-to-three hours long, face-to-face PCI was introduced to a treatment group and at the same time ‘Desert Survival’ as a placebo was provided to a control group – offered a stepping stone for further PCI research. Their study provided an approach of a micro-intervention session in developing PsyCap by intervening each of its constructs of hope, optimism, self-efficacy and resilience. Their study also provided preliminary support for the increasing PsyCap from PCI by using three sets of samples of students, practising managers, and engineering managers from a high-technology factory. Their findings reported a 3% (without providing PsyCap level of pre-and-post PCI) increase in PsyCap among the PCI participants, no change in the control group, using samples of student and practising managers, and a low increase but a still significant one using engineering managers.

Luthans et al., (2008b) examined whether PsyCap can be developed with a two-hour web-based training intervention. They utilized a diverse cross-sectional sample with 364 working adults allocated into two groups, of which the treatment group ($N = 187$) received two 45-minute training sections, while the control group ($N = 177$) received positive leadership training, which was irrelevant to the study but worked simultaneously as a placebo. Data were collected before and after the PCI. Using statistical techniques of ANOVA and ANCOVA, their findings showed a significant increase in PsyCap (pretest = 4.58; posttest = 4.70; $P = 0.016$; PsyCap increase = 2.6%) in the treatment group, whereas a significant decrease in PsyCap in the control group (pretest: 4.69; posttest: 4.64; $P = 0.061$; PsyCap increase = 1%) was observed. Further, PCI is a significant predictor in influencing the level of PsyCap post-PCI. These findings suggest that PCI increases PsyCap values.

A more recent pilot study, by Luthans et al., (2010), provides additional evidence that PCI can develop participants' PsyCap. It provided empirical evidence that PCI can lead to increased work performance. Using an experimental design, 242 students were randomly assigned into treatment ($N = 153$) and control groups ($N = 89$). Students in the treatment group received two hours of PCI training, while students in the control group received 'decision making' as a placebo, as it is irrelevant to the study. Using ANCOVA and a paired-sample t test, this study found that both PsyCap and work performance increased for the PCI participants but not for the control group participants. Another study used 80 cross-sectional working adults who were all provided with two-hours of PCI training. Therefore, this is not an actual experimental design, as the study did not build treatment and control groups. Data were collected before and after testing. The study's findings are mean PsyCap increased from 4.79 pretest to 4.93 posttest (by 3%) on a 6-point scale, ranging from 1 ('strongly disagree') to 6 ('strongly agree'). The mean work performance increased 13% when rated by self-reports and 7% when rated by managers.

Hodges's (2010) PhD dissertation explored a potential contagion effect: whether training managers' PsyCap has an impact on their followers' PsyCap as well as its outcomes (e.g. work performance and engagement). His study utilized an experimental design with samples from a U.S. financial services firm. The sample consisted of 110 managers with their 291 direct subordinates, divided into two groups: treatment group ($N = 58$ managers and $N = 239$ employees) and control group ($N = 52$ managers and $N = 152$ employees). Using ANOVA, findings showed neither a significant PsyCap increase nor a significant work performance rise for managers who participated in PCI training, which is contrary to the hypothesised relationships and not in line with previous findings (e.g. Luthans et al., 2006, 2008, 2010). Hodges's (2010) argues this might result from a 'ceiling effect' in the variables. For instance,

mean PsyCap (self-rated) of managers in the treatment group is 5.33 at pretest and 5.35 at posttest on a 6-point scale. Mean work performance (self-rated) of managers in the treatment group is 8.29 at pretest and 8.24 at posttest on a 9-point scale. When the variables are already rated highly, it is more difficult to improve them to a significantly higher level. However, the study did provide preliminary support for the contagion effect; namely, followers' PsyCap increased if their manager participated in PCI training. Using ANOVA, Hodges's (2010) PhD dissertation report no significant PsyCap difference at pre-test ratings between the treatment and control groups, but a significant PsyCap difference at post-test ratings (treatment_post-test mean = 5.10; control_post-test mean = 4.97; $F = 2.46$; $P < 0.036$).

3.3 Limitations in previous PCI studies and potential improvements

Previous studies have focused on the relationship between PsyCap and organisational variables, such as work performance, job satisfaction, and leadership. Based on the theory that PsyCap is measureable, manageable, and developable (discussed in Chapter 2.3), as the above review reveals, recent studies provided some experimental evidence that PsyCap could be improved in terms of short-term PCI training. However, the amount of such research on PsyCap's developmental effects is limited, and they have either been carried out or supervised by Luthans and his colleagues (e.g. Luthans et al., 2006, 2008, 2010; Hodges, 2010). For instance, Hodges's (2010) PhD dissertation was supervised by Luthans. Therefore, this domination of a single author on PCI research becomes the primary limitation in PCI research. A wider quantity of PCI studies from different people is needed for balance.

Although growing studies indicate that PsyCap is related to work performance, behavioural, and attitudinal outcomes, existing publications on PCI research have paid the most attention to

the development of PsyCap as well as its impacts on work performance, investigating whether PCI can increase participants' PsyCap levels, and whether developing PsyCap leads to work performance improvement. Scant attention has been paid to either behavioural or attitudinal outcomes of PCI. It is therefore necessary to undertake additional studies expanding the investigation of the results of PCI in terms of its effect on behaviour or attitudes at work. Other researchers (e.g. Luthans et al., 2010) have called for this as well. This study, in particular, investigates the behavioural outcomes of PCI, rather than the work performance aspect.

Previous experimental research (e.g. Luthans et al., 2006, 2008, 2010) on PCI mostly has been with cross-sectional design, which also may create difficulty in testing causality. Self-reporting is another problem when measuring all the variables from the same data source. Another problem could result from the execution of PCI training. Setting targets is a critical part of the training, but individuals from different occupations from different organisations might bring different mindsets regarding target setting. If PCI is delivered online, there is less opportunity to communicate about this aspect. Another risk is that the exercises might contribute only to overall enhancement of workplace outcomes, rather than focusing on PsyCap enhancement.

Although studies have been carried out to test the relationship between PsyCap and its work performance in China (e.g. Luthans et al., 2005, 2008) and in other countries, such as Greece (e.g. Xanthopoulou et al., 2009) and in Australia (e.g. Avey et al., 2010c; Walumbwa et al., 2010a), no PCI studies have been done outside the United States. In addition, the majority of PsyCap studies and all PCI studies have been conducted in the United States. Yet it is important to test the findings, as well as Luthans' PCI model, across a variety of cultures. To the best of

our knowledge, this study is the first PCI research to examine the developmental character of PsyCap as well as its behavioural impacts from PCI in a Chinese context.

Finally, the statistical techniques utilized in all previous studies included ANOVA, ANCOVA, and the paired-sample *t* test, as discussed above. Only a single factor can be analysed with these techniques. Specifically, ANOVA tests initial equivalence at Time 1 followed by testing variance at Time 2. A significant variance on PsyCap scores at Time 2 indicates PCI's effects. ANCOVA aims to evaluate PCI's impact while controlling for pretest scores. ANCOVA indicates whether the mean PsyCap scores at posttest for the two groups (PCI and NPCI) are significantly different, after controlling for the initial pretest scores. The paired-sample *t*-test evaluates PCI's impact on participants' scores on PsyCap by checking whether there is a statistically significant difference in the mean scores within the group (PCI or NPCI) between two time points. With these techniques, only the difference on a single factor can be detected, but the entire causal structure across PCI and NPCI groups is not under consideration. This study uses the statistical technique of two-group analysis to investigate the causal model across the PCI and NPCI groups, rather than a single variable, such as PsyCap. Specifically, the study tests the equivalence of the causal model by comparing constrained and unconstrained models. Following the guidance of Byrne (2012), in an unconstrained model, all estimated parameters are allowed to vary freely across the two groups. In a constrained model, factor loadings, variances, and covariances are all set equal across the two groups. The change of CFI and TLI being greater than .01 indicates a significant difference between the two groups (PCI and NPCI) (van Hooft et al., 2006). In sum, this study aims to fill in research gaps in PCI studies, and also answers calls by Youssef and Luthans (2007) and Hodges (2010) to use both longitudinal and experimental research to further explore the causality and impacts of PCI.

3.4 Conclusion

This chapter examined Psychological Capital Intervention (PCI) and particular previous research on PCI training. This chapter noted that there are only four empirical PCI publications and Luthans is connected to all four PCI studies. This chapter also noted that all four PCI studies have been conducted in the USA. This chapter discussed limitations in previous studies and potential improvements in the future. The limited amount of PCI research and domination of a single author encourage more PCI research from different people in different cultural contexts.

Chapter 4 Hypotheses development

This chapter discusses the theories within which this study was grounded. Hypotheses were established, drawing from solid theories that include SLT, emotion contagion and BB theories, COR theory, goal-setting theory, and SET. This chapter also discusses existing studies, using these theories in the area.

4.1 The mediating effect of role modelling on the relationship between authentic leadership and PsyCap

Research has suggested that an authentic leader's major task is to ensure followers flourish with increased PsyCap (Gardner and Schermerhorn, 2004). Evidence supports that a direct relationship leads from authentic leadership to follower PsyCap (Eid et al., 2012; Rego et al., 2012; Walumbwa et al., 2011). However, few studies have examined how authentic leadership's influence is transmitted to followers' PsyCap. To the best of our knowledge, only a few theoretical papers have suggested future research should extend such study by testing the process, without providing any empirical evidence. For example, some studies (Gardner et al., 2005; Schein, 2004) propose that role modelling might be the process via which authentic leaders positively influence follower PsyCap.

4.1.1 Authentic leadership and role modeling

Many studies have noted leaders have a duty to serve as role models for their employees (Deal and Kennedy, 1982; Kouzes and Posner, 1993) and 'leading by example' or serving as a role model is a source of leader influence (Bennis, 2003; George, 2003). Employees need appropriate role models to allow them to develop their careers to their fullest potential (Speizer, 1981). However, prior studies do not provide theoretical explanations. For example, it has been

suggested that having ‘good role models’ leads to career success and a ‘lack of role models’ accounts for career failure (Girona, 2002; Ross, 2002). Researchers (e.g. Bass, 1985; Conger and Danungo, 1987) studying on transformational leadership suggest leader role modelling behaviour, also termed exemplary behaviour, is a major factor by which leaders influence their followers. Authentic leadership theory also supports the notion that authentic leaders serve as models by which they can develop followers (Gardner et al., 2005; Luthans and Avolio, 2003).

This study aims to discuss the theories underpinning authentic leadership and role modelling. SLT (Bandura, 1977, 1986, 1997) can be used to explain leaders’ motivation to undertake role modelling. This theory suggests people learn behaviour by observing and imitating others in a social context and draws on the notion of vicarious learning, which posits people do not necessarily need to depend on direct experience to learn new ideas or behaviours; instead, such can be formed by observing a model, such as leaders. SLT (Bandura, 1977, 1986, 1997), as an explanation mechanism, has been used to explain how leaders can influence their employees via role modelling, suggesting that ‘ethical leaders become social learning models’ via which employees learn behavioural practices (e.g. Brown et al., 2005, p. 120, 123).

Due to the nature of authenticity, authentic leaders tend to promote positive relationships through transparent behaviour, so communication between them and their followers will be effective and create a positive work environment. Leaders who score highly on authenticity are more likely to model for followers through word and deed, demonstrating higher levels of balanced processing, internalized moral perspective, transparency, and self-awareness. Authentic leaders wish for their followers to treat them authentically as well (Avolio et al., 2004) and thus tend to set up themselves as role models to shape followers’ authentic behaviour

(Avolio et al., 2004; Gardner et al., 2005; Ilies et al., 2005; Shamir and Eilam, 2005). For example, Gardner et al., (2005) propose that authentic leaders tend to develop authentic followers. As positive role models, authentic leaders serve as a key input to shape followers' authentic behaviour. Finally, authentic leaders are also concerned with their own self-development, as proposed in the study by Avolio et al., (2004), They are more likely to comprehend on-going challenges and improve their managerial effectiveness. It is likely that demonstrating high levels of transparency and integrity serve as pivotal forces in authentic leaders' personal growth and development. An active role modelling might be the best way to meet this need. This reasoning has been supported by theoretical research and conceptually discussed by Schein (2004) who notes that role modelling is an embedding mechanism that authentic leaders employ to have an impact on their employees.

However, does a leader's role modelling truly guarantee a follower accepts a leader as a role model? Although authentic leaders may intend to deliberately act as role models, to influence employees' PsyCap, employees also must perceive their leader as a role model. Therefore, the next section explains the role modelling of the leader from the employee's prospective rather than simply from the leader's perspective. Thus, the variable of role modelling concerns two sides: whether a leader acts as role modelling, as discussed above; and to what extent such role modelling behaviour influences followers.

As discussed in Section 2.2, researchers (Avolio et al., 2004; Cooper et al., 2005; Gardner et al., 2005; Walumbwa et al., 2008) noted that Authentic leaders display high levels of integrity in line with their values; show a willingness to openly share information and express their true thoughts before employees ; demonstrate tolerance for or even welcome views that may

challenge their own deeply held positions; cultivate the habit of providing constructive feedback, even though it might be harsh; show a willingness to share their life story, which is truly consistent with their deep, personal values; believe in continuously developing the self and express a genuine desire to develop their followers, which may engender credibility, admirability, and trustworthiness on the part of their employees. When followers perceive a leader possesses such qualities (e.g. credibility, admirability, and trustworthiness), they strive to emulate that person and follow their leader. Theoretical research is in line with the above reasoning. According to Gardner and Avolio (1998), credibility and respect are established when leaders' actions match their claims. Followers will evaluate whether leaders 'walk their talk' – whether their leaders' behaviour is consistent with their expressions and values (Eid et al., 2012). Bandura (1997) suggests observers behave with greater intent and are motivated to learn from a credible, trustworthy model. Indeed, many researchers claim authenticity helps leaders establish credibility and gain their employees' admirability (e.g. Kouzes and Posner, 2002; Peus et al., 2012; Sparrowe, 2005). Avolio et al., (2004, p. 806) suggest that authentic leaders 'act in accordance with deep personal values and convictions, to build credibility and win the respect and trust of followers'. Ilies et al., (2005) propose that authentic leaders' personal integrity and self-awareness leads to unconditional trust on behalf of their followers, which will influence followers' personal identification with the leader. Walumbwa et al., (2008) suggest authentic leaders act in accordance with deep personal values and convictions to build credibility and win followers' respect and trust. Rego et al., (2012) note employees may feel grateful and respect their leaders, willingly emulating them, even if they receive constructive criticism and feedback from authentic leaders, providing that such criticism or feedback is communicated in a respectful and developmental manner (Ilies et al., 2005; Luthans and Youssef, 2004; Luthans et al., 2007b).

As discussed above, it is predicted that authentic leadership has effect on role modelling. It is aware that authentic leadership's effects on employees may take some time to materialise, and the influence can hardly be detected if data is measured at the same time. Though little study on effective authentic leadership has considered its time-lagged effects, the study by Hmieleski et al., 2012 examined one-year lagged firm performance as indirect consequences of CEOs' authentic leadership. Therefore, this study proposes a lagged effect of authentic leadership on role modelling, which examines the effect of authentic leadership on Time 1 on role modelling on Time 2.

Hence, the study posits the following hypothesis:

Hypothesis 1a: Authentic leadership has time-lagged effects on role modelling.

4.1.2 Role modeling and PsyCap

Positive role modelling is regarded as a primary means for leaders to develop follower authenticity (Avolio et al., 2004; Gardner et al., 2005). Authenticity displayed through role modelling can be imitated and learned by followers, according to Bandura's (1977, 1986, 1997) SLT. Over time, followers will behave and act authentically in the same way authentic leaders do. Previous conceptual works support this idea: 'A supervisor's exemplary behaviours empower subordinates to believe that they can behave in a like manner' (Conger and Kanungo, 1998, p. 479). According to Ilies et al., (2005), Gardner et al., (2005), and Walumbwa et al., (2008), authentic leaders tend to foster authenticity in their followers, helping them achieve positive self-development. Thus, promoting PsyCap is another task for authentic leaders: Acting as role models builds followers (Gardner and Schermerhorn, 2004). This study explains

the relationship of role modelling and PsyCap from three aspects: intervening authenticity, evoking positive emotion, and initiating observation learning.

4.1.2.1 Authenticity

Authenticity not only engenders credibility and trustworthiness but also has an impact on each dimension of follower PsyCap. According to Gardner and Schermerhorn (2004), authentic leaders can affect each dimension of follower PsyCap. Specifically, role modelling serves as a key input for followers: By word and deed, the leader sends a clear message to the follower about what can be achieved. Walumbwa et al., (2008) also reports that authentic leaders can foster follower authenticity, resulting in positive self-development in the latter.

As discussed in Section 2.2, there are four dimensions of authenticity. Relational transparency refers to leaders' confidence, and an expression of persuasion is clearly demonstrated in the role model; via mastery, experiences can foster a climate of 'can do' and 'doing the right thing', which facilitates follower self-efficacy, leading to enhancement of the overall PsyCap.

Balanced processing is characterised by listening to different opinions, processing all relevant information before making decisions based on objective analysis, and encouraging different opinions, even if doing so contradicts with leaders' initial thoughts. When both leaders and employees are authentic, the balanced process is part of the overall experience, with both parties intent on creating a fair and positive cause, serving as the common interest in workplaces. Consequently, a positive attribution style (optimism), by which a person attributes success to internal and stable causes, and failure to external and unstable ones, is likely to be generated in the work environment. Establishing optimism contributes to the overall PsyCap. Self-awareness is characterised by recognizing one's strengths and weaknesses, how others perceive them, and how one's behaviour impacts other people. Under this concept, a sense of

hope demonstrated by leaders' exemplary behaviour arouses followers' internal motivation and goal-oriented commitment, creating a sense of hope in followers. Establishing hope contributes to the overall PsyCap. Being relationally transparent, leaders and followers intend to support each other by using all necessary resources in the face of adversity, and balanced processing creates an open atmosphere for information sharing, enabling employees to predict obstacles, make contingency plans, and proactively produce pathways to cope with difficulties or problems. With available plans, supports, and resources, employees are more likely to recover quickly and keep moving forward positively, even when encountering adversity or setbacks. As a result, resilience is strengthened, leading to the overall enhancement of PsyCap.

4.1.2.2 Positive emotion and PsyCap from leader

An authentic leader's role modelling displays positive emotion and 'elicit[s] positive emotions from followers' (Avolio et al., 2004). This positive emotion can be infectious to followers and can increase follower PsyCap, according to emotion contagion theory and BB theory. Role modelling behaviour can provide a platform for conveying positive emotion. As a result, followers are likely to 'catch' this positive emotion, especially in workplaces with frequent interaction between leader and employees. Theoretical evidence citing emotion contagion by Rego et al., (2012) supports that the emotional states of leader and follower converge via the emotion contagion mechanism. Other researchers suggest authentic leaders usually display more positive emotions than inauthentic leaders do (Avolio et al., 2004; Ilies et al., 2005), which might be more easily for followers to be influenced.

BB theory (Fredrickson, 1998, 2001) also provides a theoretical explanation of positive emotions' benefits. It states that positive emotions in particular are infectious and cause positive upward spirals for success. Specifically, positive emotions 'broaden' peoples' view and mindset,

facilitate creative thinking, new ideas, and a desire to explore actions, through which more positive capabilities and resources can be ‘built’ (e.g. intellectual, social, and psychological resources). As a result, follower PsyCap flourishes via the positive emotion displayed in role modelling.

Highly authentic leaders possess reserves of PsyCap; that is, they feel hopeful, self-efficient, resilient, and optimistic (Avolio et al., 2004, Luthans and Avolio, 2003). These positive states also can be displayed through role modelling and provide inputs for followers to imitate, with a positive PsyCap transmission from leader to follower occurring. Avey et al., (2011b) report a positive relationship between leader and follower PsyCap, forming their hypotheses from two arguments. Firstly, they argue it is notable that a leader positively contributes to followers’ effort and performance. If leader-positive PsyCap cannot be conveyed to followers, its influence on performance will be minimized or is nonexistent. Secondly, leader-follower PsyCap conveyance can be predicted through daily communication in the work context. For example, confidence expressed by the leader makes followers feel comfortable and gives them confidence.

The study predicts the same relationship but adds the role modelling process, which serves as the explanatory mechanism. Positive PsyCap displayed by a role model is more explicit and easier for employees to understand than verbal communication, leading to a more powerful PsyCap transmission than what daily communication might achieve.

Leaders whose authenticity is high should have more powerful PsyCap (Avolio and Gardner, 2005; Gardner et al., 2005; Luthans, 2002b), because authentic leadership arises out of positive

PsyCap (Luthans, 2002b). Luthans and Avolio (2003) also claim a positive PsyCap of self-efficacy, optimism, hope, and resiliency is a personal resource on which authentic leaders can draw. Further, high leader PsyCap leads to high follower PsyCap. The study supports this opinion, and for the first time, intends to empirically examine the relationship between authentic leadership and follower PsyCap via role modelling's mediating role. The explanation could be that authentic leaders possess positive PsyCap, which includes self-efficacy, optimism, hope, and resiliency, displayed via role modelling. For example, role modelling provides credible evidence of willpower and waypower, convincing followers to put forth efforts toward reaching their goal-oriented actions as leaders do, resulting in strengthened hope; role modelling also displays an availability of contingency plans in the face of difficulties. As discussed, followers often come to behave similarly to their leaders, due to authentic leaders' credibility, admirability, and trustworthiness. Gardner and Schermerhorn (2004) provide theoretical arguments that authentic leaders are more likely to build follower PsyCap. Empirical evidence by Rego et al., (2012) supports the positive relationship between authentic leadership and follower PsyCap.

4.1.2.3 Observation learning

Observation learning represents a potentially powerful mechanism to explain follower PsyCap extending from role modelling for the following reasons: Highly authentic leaders are characterised by high levels of self-awareness, balanced processing, relational transparency, and an internalized moral perspective (Avolio et al., 2004; Gardner et al., 2005; Ilies et al., 2005). Such positive, authentic behaviours explicitly displayed via role modelling indicate a consistent alignment of authentic leaders' words, deeds, and core values. Turning words into actions requires knowledge, expertise, and effort, which authentic leaders acquire via self-awareness and self-development. Doing so can help authentic leaders gain followers' credibility

and admirability (Gardner et al., 2005). According to Bandura (1997), observational learning theory dictates people cannot pay attention to everything, and they select that to which they can pay the most attention, concentrating on particular elements and ignoring others. Authentic leaders' credibility, trustworthiness, and admirability get observers' attention, motivating them to learn. Therefore, role modelling provides not only examples but also a powerful inspiration for followers to continue pursuing observational learning.

Once followers retain the information from the role model displayed, they turn to memorizing it and recalling the role model's behaviour, even when that individual is not present. Therefore, the ability to actually reproduce the behaviour from observation increases through frequent replication and practice of the learned behaviour. If the new approach brings no benefits, the model will be abandoned, and the follower will search for other models. When people see that the new behaviour is successful or leads to the desired results, however, they will be motivated to use it again, reinforcing the learned behaviour. Gradually, followers grow more able to choose appropriate role models and pay attention to their key behaviours for imitating. They can determine and regulate their own behaviour by judging what is and is not appropriate. As a consequence, the observer's self-efficacy in his own ability to execute the correct behaviour is enhanced, resulting in consistent engagement with observational learning. Self-efficacy is part of PsyCap, and due to PsyCap's synergistic effects (Avey et al., 2010b; Peterson et al., 2011; Walumbwa et al., 2010b), other PsyCap constructs work together; therefore, overall PsyCap in turn is predicted to increase over time.

The prediction that positive emotions flourish followers' PsyCap can be explained by other theories. Specifically, once employees have been influenced by authentic leaders' positive

emotions, it is expected such positive emotions will create greater attention and engagement in the observational learning of role modelling, leading to employees feeling more confident and hopeful, which is associated with replenishing their PsyCap. Due to this reciprocity, the broadening of resources in turn will create more positive emotions for employees, leading to sustainable PsyCap development.

Hence, the study posits the following hypotheses:

Hypothesis1b: Role modelling has positive effect on PsyCap.

Hypothesis1c: .Role modelling fully mediates the relationship between authentic leadership and PsyCap.

4.2 The mediating effect of PsyCap on the relationship between role modelling and work competence

Work competence represents the effectiveness, in terms of quality and quantity, of an individual's capability to perform a specific task or duty. It is generally agreed that work competence is a predictor of work performance (Campbell et al., 1993; Heilman et al., 1997). Employees demonstrating a high level of work competence generally perform better than those with a low level. Therefore, work competence has been used as a measure to predict work competence (e.g. Walumbwa et al., 2008; 2010a). For example, Walumbwa et al., (2010a) report PsyCap is positively related to work competence, using a four-item scale to measure work competence (e.g. immediate supervisor ratings of employees' job competence, overall competence, work efficiency, and work quality), which means empirical evidence concerning the relationship between employee PsyCap and work competence already exists.

Employees' personal resources (daily levels of hope, optimism, self-efficacy, and resilience) explain work competence. The higher are employees' levels of PsyCap, the higher their work competence. Many theories (e.g. goal setting, BB, COR) can be used to explain why follower PsyCap determines work competence.

Positive resources, including self-efficacy, hope, optimism, and resilience that constitute PsyCap, can each independently contribute to building employees' work competence. Specifically, individuals with high PsyCap are characterised as more self-efficacious, hopeful, optimistic, and resilient (Luthans, 2002a;2002b; Luthans, et al., 2007b). Each of these contributes to establishing work competence. For example, self-efficacious as a dimension of high PsyCap, refers to confident employees who possess sufficient skills and capabilities to complete tasks; therefore, they are motivated to work at a high level of effectiveness (e.g. good quality, quantity, and efficiency), which constitutes their specific work competence. Hopeful employees have pathways thinking and willpower through which they are more energetic at being creative in determining the best ways to maximize work results; over time, their skills, abilities, and experiences of seeking alternative pathways and mastery in successfully putting forth creative efforts will be raised in turn; such activity also contributes to establishing workplace competence. Optimistic employees maintain a positive future outlook and positive attribution. They attribute causes of career success to internal and permanent situations rather than luck, also bringing about work competence or motivating them to further develop their competence. Resilient employees persist, despite adversity and setbacks, allowing them to persevere in developing work competence. Due to synergistic effects, overall PsyCap can affect work competence, since each component of PsyCap contributes. Avey et al., (2010b) report a

positive relationship between PsyCap and work performance, and their explanation is that trying better leads to a better performance. However, they ignored the process concerning how work performance emerges as a result of PsyCap. As PsyCap level may affect work performance via the process of work competence given that work competence is a predictor of work performance. This study expects that employees will gain more job-specific task proficiency when they put more efforts; that is, over time, the adaptation and skill improvement (work competence) associated with motivational efforts and resource conservation can occur as a direct result of state-like PsyCap.

Applying the goal-setting theory discussed in Chapter 2, setting challenging and clear goals – one aspect depicted by the characteristics of hope and self-efficacy – results in a positive impact on work competence. Individuals who are hopeful and self-efficacious likely possess goal-oriented energy, allowing them to undertake necessary actions, mobilize resources, and adjust their tasks and pathways in achieving their aims and objectives. Resilience can also contribute positively to individuals' work competence. For instance, coping and persistence, which are elements of resilience, can serve as outstanding resources for work competence. Coping determines individuals' ability to recover from adversity, which is regarded as a valuable resource for ultimate success in long-term projects. Persistent individuals who are more committed to goals are inclined to put forth greater effort, which forms one of the most powerful drivers of capability. Therefore, high PsyCap individuals are more likely to set challenging but attainable goals, to put forth more effort than is strictly necessary, and to react more quickly, due to proactive, contingent planning. In pursuing challenging but reachable goals, and proactively preparing pathways, necessary actions, and coping skills, high PsyCap

employees are more likely to produce high-quality products more expeditiously than low PsyCap workers.

As discussed above, authentic leaders display positive emotion in their role modelling behaviour, and employees can ‘catch’ this positive emotion, according to emotion contagion theory. Moreover, according to BB theory (Fredrickson, 1998, 2001) positive emotion, though fleeting, can build enduring psychological resources and trigger upward spirals, leading to expanded attention, actions, and concerns about personal development over the long term (Cohn et al., 2009; Fredrickson and Losada, 2005). The broadened mindset in turn seeks to establish more positive emotions, capabilities, and resources. With the reciprocal ‘broaden’ and ‘built’ cycle, enduring job resources, such as work competence, can be strengthened over time. Fredrickson and Branigan (2005) and Isen (2000) have reported on the evidence for the effects of BB theory. Both studies suggest that positive affect produces a broad, flexible cognition and the capability to integrate diverse information at the organisational level. This suggests that, in comparison with low-PsyCap employees, high-PsyCap employees are more able to mobilize both personal and job resources, which in turn can fuel future work competence. COR theory (Hobfoll, 2002; Wright and Hobfoll, 2004) provides a complementary rather than a competing explanation: employees are motivated to acquire, maintain, and foster necessary resources. However, different levels of PsyCap might differentiate individuals’ ability in resource acquisition and conservation, which in turn might differentiate their work skills, work efficiency, and capabilities, and then employees’ workplace competence. Unlike the stable, intellectual or social capital, PsyCap is state-like (Luthans 2002a, 2002b; Luthans et al., 2007b) and more easily lost. PsyCap’s state-like nature provides for the possibility that employees

deliberately and proactively build up more stable resources (e.g. work competence) over time to meet their current work demands

In sum, each theoretical application and explanation leads to a well-recognized foundation supporting the PsyCap–work competence relationship. These dimensions, along with the active interplay among them, provide a powerful explanatory mechanism for this relationship being a predictor of work competence.

Hence, the study posits the following hypotheses:

Hypothesis 2a: PsyCap has positive effect on work competence.

Hypothesis 2b: PsyCap fully mediates the relationship between role modelling and work competence.

4.3 The mediating effect of work competence on the relationship between PsyCap and OCB

OCB refers to employees' discretionary behaviour not linked with any formal reward system but that promotes the organisation's effective functioning. Prior studies report employees with high levels of PsyCap exhibit more OCBs than employees with low levels (e.g. Avey et al., 2011b; Walumbwa et al., 2010b). However, researchers have largely ignored the process concerning how OCB emerges as a result of PsyCap. The study proposes several reasons for an indirect relationship, mediated through work competence.

Firstly, employees' efforts in performing their formally defined jobs contribute to organisations, but it is well recognized that organisations also need employees to contribute in ways that go beyond their formal duties (Katz, 1964) – that is, to perform OCBs (Organ, 1988). Both in-role performance and contextual performance (OCB) contribute to organisations. Thus, issues that divert attention away from either can be expected to hurt performance. Authentic leaders build up followers' positive emotions, PsyCap, and work competence via the role modelling, because, as discussed above, developing followers is a task of authentic leaders. Conversely, authentic leaders' role modelling itself displays extra-role behaviour or OCB. Followers might be more likely to behave similarly, due to reciprocal concerns. Followers obtain resources and support from authentic leaders, and are more likely to fulfil the latter's expectations (e.g. OCB) in return. On the other hand, driven by social exchange philosophy, employees are more likely to help others, particularly when they possess solid work competence. Social exchange is an on-going reciprocal process whereby people's social interaction is an exchange of resources (Blau, 1964). Social capital represents social networks (e.g. colleagues, general contacts) through which people receive opportunities to use other types of capital, such as those of the financial and human varieties (Burt, 1992). When a source of opportunity, motivation, and ability is ready, social capital can be generated (Adler and Kwon, 2002). In workplaces, particularly within the team-work structure, face-to-face interaction among employees makes it possible for employees to build network ties and mobilize resources through them. Expectations of receiving future returns can explain motivation to pursue potential contribution, in the absence of immediate returns. As the social exchange relationship can be developed not only among employees but also between employees and supervisors, employees behaving above and beyond the call of duty can expect an exchange of material and

spiritual security beyond that derived from obedience to authority. Hence, work competence serves as a precondition for employees to carry out OCB.

Further, through the process of role modelling influencing PsyCap and thus influencing work competence, authentic leaders encourage OCB. Employees benefit from their authentic leaders in terms of learning opportunities, positivity, and an accumulation of their personal and job resources, which are not only necessary to deal with their job requirements but also are vital in their own right. As a result, they might perceive such opportunities as extra benefits and might want to give back something extra. Supporting this view, Lambert (2000) suggests the obligation engaging OCB is the currency of reciprocity to produce ‘balance sheets’ that take into account the relationship between benefits accruing to exchange partners (Blau, 1964; Coleman, 1972; Emerson, 1976). Meijman and Mulder (1998) note people more willingly dedicate their efforts when they have sufficient job resources. When authentic leaders create resourceful work environments, employees likely will be more willing to undertake extra roles. In sum, as employees derive greater benefits, they may feel obligated to exert ‘extra’ effort in return for ‘extra’ benefits. In other words, the condition identified by social exchange theory, that employees can indeed feel obligated to reciprocate, exists.

Employees’ willingness to undertake OCB can also be explained by BB theory (Fredrickson, 2003) and COR theory (Hobfoll, 2002; Wright and Hobfoll, 2004). According to COR theory, employees seek to acquire and retain resources, and losing them can cause great stress and feelings of insecurity. Under this assumption, employees are more likely to acquire resources that are immediately available or easy to obtain (liquid), when they have chances to acquire multiple resources. Specifically, because high PsyCap employees are more likely to have great

work competence, OCB is one likely avenue to explore in developing social capital, although doing so takes time. This study proposes a flow of resources converting from the most liquid one, PsyCap, to one less so, work competence, and further converting into the least liquid type of social capital by demonstrating OCB. Applying the BB theory of positive emotions (Fredrickson, 2001, 2003), positive emotions help people broaden their thoughts–actions repertoires, which in turn builds more positive emotions and resources (ranging from physical and intellectual to social and psychological resources). For instance, employees with high work competence (intellectual resources) are more likely to display positive emotions that can be generated from feeling competent, or alternatively, from a reciprocal outcome of broadened thought–action from PsyCap to work competence, as discussed. These positive resources consisting of work competence and positive emotion together share the capacity to continuously broaden thought and action, increasing the potential for proactive extra-role behaviour, such as helping colleagues or making more contributions to organisations by taking on extra roles. Hence, role modelling generates employees’ PsyCap, which in turn enhances work competence and results in the execution of OCB.

However, the level of work competence might differentiate individuals’ capability in acquiring and conserving resource. Specifically, qualified competence might be helpful for employees to take extra roles (e.g. OCB). Competent employees are more likely sensitive to colleagues’ needs and are more outgoing and willing to help others. On the contrary, when employees lack competence – that is, are unable to be vulnerable because they have limited capability and time – their cognitive resources will be preoccupied with a focus on their role duties, and less able to take on any off-role activities because of the time and energy devoted to in-role activities. This

is consistent with a previous study by Wright et al., (2001) noting that desired behaviour (e.g. OCB) cannot be exhibited without required skills.

In sum, in order to retain, protect, and acquire resources, employees are more likely to expand their PsyCap, converting it into work competence. High work competence provides the employee with energy (can do) to undertake volunteer work and the motivation (want to do) to go the extra mile. This can help them not only to fulfil authentic leaders' expectations reciprocally but also to increase their chances of acquiring more resources in the future. Employees whose work competence is high will be more likely to engage in OCB. If work competence is low, OCB is less likely to occur.

Hence, the study posits the following hypotheses:

Hypothesis 3a: Work competence has positive effect on OCB.

Hypothesis 3b: Work competence fully mediates the relationship between PsyCap and OCB.

4.4 The transmission effect of PCI on the consequences of authentic leadership

4.4.1 The difference in supervisor's PsyCap between PCI and NPCI

As discussed in Chapter 3, PCI training is designed to enhance each construct of PsyCap, including hope, self-efficacy, resilience, and optimism, leading to an increase in the overall PsyCap level. This study follows the original procedure suggested by Luthans et al., (2007b). Therefore, it is predictable that participants in PCI training will experience increased PsyCap, consistent with much of the empirical evidence (e.g. Luthans et al., 2006, 2008, 2010). For

individuals who have not participated in PCI training, their PsyCap may also change due to its nature of state-like. However, given the two groups are under the same conditions in all other ways except for PCI training provided for PCI group, a greater PsyCap is predicted in PCI group than NPCI group.

Hence, the study posits the following hypothesis:

Hypothesis 4a: A supervisor in PCI group will observe increased PsyCap from Time 1 to Time 2, comparing with supervisors in NPCI.

4.4.2 The difference in consequences of authentic leadership between PCI and NPCI

As previously discussed in Section 2.3, role modelling is related to leader's authenticity, credibility, admirability, trustworthiness, positive emotions, and PsyCap. The qualities and characteristics of authentic leader affect the extent of followers' social learning (discussed in section 4.1). It is predicted that supervisors will observe increased PsyCap after they received PCI training, which might in turn produce more positive emotion and authenticity as a side-effect of PCI. These improved attributes might help a leader exhibit more positive exemplary behaviour. As a result, followers are more likely to imitate and follow their leaders. Hence, role modelling will likely increase. The increase of role modelling after PCI will result in an increase of follower PsyCap and work competence and OCB in a sequential way under the assumptions of Hypotheses 1–3.

Hence, the study posits the following hypothesis:

Hypothesis 4b: Authentic leadership in PCI group has stronger effects on role modelling, PsyCap, work competence, and OCB sequentially from Time 1 to Time 2, comparing with NPCI groups.

4.5 Test the hypotheses at individual and team level

Evidence indicates that the extent of effective leadership is different between individuals and teams. For example, a meta-analysis review by Degroot, Kiker, and Cross, (2000), examining the relationship between charismatic leadership and performance at individual versus group level, report that leadership has stronger effects at group level than individual level based on empirical evidence showing ‘an effect size at the group level of analysis that is double in magnitude relative to the effect size at the individual level’ (Degroot et al., 2000, p. 363). They explained that such difference might be caused by group- level phenomenon which suggests that effects of leadership are based on the team level perceptions. The study by Bass, Avolio, Jung, and Berson, (2003), examining the effects of transformational and transactional leadership on unit performance, also suggests that the existence of group- level phenomenon is particularly true when a task is designed to facilitate highly interdependent work among the team members.

However, it has been acknowledged (e.g. Luthans and Avolio 2009a) that previous POB study overemphasized at individual level of analysis but not considering group levels. This study tests the hypotheses not only at individual but also at team level.

4.6 Conclusion

This chapter used theoretical frameworks discussed in chapter 2 to develop four hypotheses, exploring the mediating effects linking authentic leadership with OCB by means of role

modelling, PsyCap and work competence (1a, 1b, 1c, 2a, 2b, 3a, 3b), and transmission effect of PCI on the consequences of authentic leadership (4a, 4b). This chapter noted a lagged effect of authentic leadership on role modelling and provides rationale. This chapter noted that the extent of effective leadership is different between individuals and teams. Therefore, this study aims to test hypotheses not only at individual but also at team level.

Chapter 5 Methodology

This chapter describes the methodology used to test the hypotheses and the research design applied to carry out the study. Firstly, the philosophy underpinning this research, as well as the research design rationale, is discussed. Then the background of the Chinese organisations chosen for this study is introduced. Further, an introduction concerning how the sample was selected, how the data were obtained, and how the variables were measured is given, followed by a discussion of the potential advantages of the method, samples, data sources, and the translation-back-translation process.

5.1 Research philosophy: positivism or interpretivism

Positivism and interpretivism are two different research methods that reflect different views about social structures. Positivism views reality from the native point of view (emic), with little reference to the meaning of the observer's subjective feelings and interpretation (etic) (Lee, 1991; Morgan and Smircich, 1980). Positivism takes objectivity as an ontological assumption and proposes hypothetico-deductive method, which states that theorised entities must be observable and proven, serving preconditions that hypotheses can be tested (Lee, 1991; Morgan and Smircich, 1980). Researchers often use synonyms, such as 'empiricism' and 'quantitative', to describe 'positivism' (Bryman, 1984; Lee, 1991). Unlike positivism, interpretivism views reality in a subjective, flexible way. The ontological assumption of interpretivism is subjectivity. Interpretivism argues that meaning is held by the subjects rather than the objective existence (Lee, 1991; Morgan and Smircich, 1980). Under this concept, interpretivism aims to understand the context of meaning held by the subjects (Bryman 1984; Morgan and Smircich 1980). Interpretivism promotes a commitment of one's subjects, as it is described in this study by (Bryman 1984, p. 77) 'see the social world from the point of view of the actor'.

A detailed comparison of these two methodologies is presented in Table 5–1, which presents a summary of their research methods and highlights contrasts in their descriptive characteristics, epistemological aims, ontological assumptions, points of view, advantages, data characteristics, data collection procedures, and measurement instruments. For instance, positivism aims to study systems, process and change, while interpretivism is devoted to understanding the construct of social reality (Morgan and Smircich, 1980). Typical measurement instruments of positivism include the survey or the lab experiment; whereas interpretivism uses the interview or the researcher observation approach (Bryman, 1984).

Table 5–1: Comparing positivism and interpretivism from a research perspective

Difference	Positivism	Interpretivism
Descriptive Characteristics	Quantitative Empiricism	Qualitative Realism Naturalism Constructivism
Ontological assumptions	Reality as a concrete process Objective Hypothetico-deductive logic	Reality as a social construct Subjective ‘See the social world from the point of view of the actor’
Epistemological aim	To study systems, processes, and change	To understand how social reality is created
Point of view	Emic (native point of view) Emphasis on fixed measurements, hypotheses, and testing	Etic (observer’s point of view) Phenomenologically based research Emphasis on discovering novel or unanticipated findings and contextual understanding
Advantages of methods	Operational definitions Replicability causality	Fluid Flexible Closer involvement of researchers
Data characteristics	Surface level Deficient superficial	Underlying assumptions Rich In-depth
Advantages of data collection procedures	Convenient Economical Expeditious Large sample size	Inconvenient Expensive Time consuming Small sample size
Measurement instrument	Quantitative survey data (e.g. survey, lab experiment)	Qualitative field observation (e.g. participant observation, interview)

Differences between these two methodologies produce differing preferences and proponents. For example, one proponent of positivism methodology justifies the preference for survey by referring to its ability to meet the requirements of operational definitions in terms of replicability and causality (Giddens, 1974). Specifically, criteria questionnaires can be operationalised; replication can be achieved by employing the same measure in another study; and causality can be tested by conducting regression or path analysis techniques using survey data. Interpretivism criticizes that positivism merely extends what is already known but ignores the underlying ‘meaning’ in social life; consequently, the survey data is deemed to be deficient and superficial (e.g. Easterby-Smith, Thorpe, and Jackson, 2012). It is argued that data yielded from phenomenologically based research have a great deal of depth and variability and are thus more complete and scientific (Bryman, 1984). Many researchers (e.g. Diriw ächter and Valsiner, 2006; Morgan and Smircich, 1980) claim that qualitative approach is an effective research because the researchers can be closely involved to explore contextual meaning of the subjects.

While positivism and interpretivism each has unique advantages, the research questions determine which method is most appropriate (Diriw ächter and Valsiner, 2006; Lee, 1991). This study uses a positivism method for, mainly, two reasons:

As discussed in Chapter 1, this study aims to investigate the consequences of authentic leadership and PsyCap. Several causal models are hypothesised which need to be tested. To determine cause and effect, the design must consider assessing variables over time. Specifically, data measuring the variables must be collected in two rounds, 1st round before the PsyCap intervention and 2nd round afterwards. Relationships among the research variables – authentic leadership as the predictor variable, along with role modelling, PsyCap, and work

competence as the mediating variables, and OCB as the criterion variable – must be investigated using data from both the initial and repeated collection. Given this goal, quantitative approach is appropriate due to its advantages of operational definitions and ease replication. This will enable a researcher to use the same measurement construct, and via the repeated data collection procedures, to check the validity of the initial investigation (Bryman, 1984; Bryman and Bell, 2003). Most important, to examine causality, the design must be of a longitudinal type rather than cross-sectional, which does not allow for confident causal conclusion. As suggested by Spector (1994), the strongest design is an experimental longitudinal design in causality testing. With it, a questionnaire survey is appropriate because statistical analysis for causal models can be examined and causal inference can be reached with quantitative data collected from two survey rounds. The change of pre-and-post PCI training between trained (PCI group) and untrained respondents (NPCI) should be investigated, because it accounts for the effect of the PCI training. This is consistent with the assertion that choosing quantitative research is appropriate to test causality (Bryman, 1984; 2000; Bryman and Bell, 2003; Lee, 1991). In order to generalise causal inference with experimental design, a positivism approach must be used (Shadish, Cook, and Campbell, 2002).

Moreover, the research design incorporates a large sample size from China's manufacturing industry to increase the possibility of generalisation. Quantitative research is advantageous in checking to what extent the samples upon which study is carried out are representative of a large population (Bryman and Bell, 2003). Further, objective criteria and structured research with a large samples size makes it possible to achieve statistical reliability (Wright and Crimp, 2000, p. 374), which in turn is representative of the large population. This is in line with the suggestion by Malhotra and Birks (1999) that the survey questionnaire is appropriate to use

when examining a valid generalisability. Creswell (2009) suggests that the questionnaire provides a simpler, economical, and expeditious method when collecting data from large samples. On the contrary, the interview approach is more suitable for research designs with a small sample size, because collecting rich, in-depth data by exploring underlying assumptions is very time-consuming and probably more expensive than doing so with smaller samples. Therefore, this study chooses the survey approach that will be most effective at handling a large sample size to reach a generalisable conclusion.

5.2 Context of study

The severe global-wide economic downtown that occurred in 2008 affected the manufacturing industry in China from 2010 on into the present. *The Economist* reported that the financial crisis produced a ‘manufacturing crisis’, particularly in export-based economies such as China’s. Mr Lang Xianpin, a prominent Chinese economist, also claimed that of manufacturing, which has caused difficulties for both employees (typical production workers) and employers.

For production workers, as an example, the soaring prices of basic commodities – in particular, foodstuffs such as rice, cooking oil, and vegetables – have risen more than 100% over the last few years. According to data published by the World Bank, China consumer price index reveals prices rose 5.9% in 2008, declined –.7% in 2009, and rose thereafter at rates of 3.3% in 2010, 5.4% in 2011, and 2.7% in 2012. China’s working poor are deeply affected by higher food costs. According to statistics published by the China Animal Agriculture Association (www.caaa.cn), the pork price per kilogram fluctuated from RMB 12 to 22 from 2008 to 2012, accounting for a 70% to 210% increase, compared with the average price of around RMB 7 from 2003 to 2007.

Further, due to fewer production orders during the economic crisis, production workers found fewer opportunities to work any overtime hours to earn money beyond the minimum wage. Overtime pay used to account for a large proportion of production workers' total wages before the economic crisis. By law, companies are required to pay a higher salary for any additional working hours: 150% times for weekdays, 200% for weekends, and 300% for public holidays. According to data published by the Ministry of Human Resources and Social Security of the People's Republic of China (see Table 5–2), the minimum wage in Shenzhen ranged from RMB 900 in 2008 to 1,500 in 2012, indicating an average 13.2% increase over the period, which is insufficient to compensate for the impact of rising food prices. The average social wage was RMB 3,233 in 2008, 3,621 in 2009, 3,893 in 2010, 4,205 in 2011, 4,595 in 2012, indicating that production workers' wages account for approximately 30% of the average social wage, highlighting the extreme poverty faced by production workers and their disadvantaged position in retaining their basic standard of living. In addition, China's production workers migrate from villages into the central manufacturing area and normally visit their rural family once a year during the Chinese New Year. Apparently, external inflation and the decline in income standards disproportionately affected production workers, making it difficult to maintain their basic living standard for both their families back home as well as themselves. Hu Xingdou, professor of economics at the Beijing Institute of Technology, notes: 'People relate food prices with social stability because it affects the poor.... They're the ones who will struggle the most to keep up with the rising cost of living'.

Table 5–2: Minimum wage and social average wage in China, 2008–2012

Years	Minimum wage	Years	Average social wage
2008/7/1–2009/6/30	900	2008/7/1–2009.6.30	3,233
2009/7/1–2010/6/30	900	2009/7/1–2010.6.30	3,621
2010/7/1–2011/3/31	1,100	2010/7/1–2011.6.30	3,893
2011/4/1–2012/1/31	1,320	2011/7/1–2012.7.30	4,205
2012.2.1–	1,500	2012/8/1–	4,595

Source: Ministry of Human Resources and Social Security of the People’s Republic of China, _ Shenzhen

<http://www.szhrrss.gov.cn/>

On the one hand, for the companies, challenged with receiving fewer production orders but paying higher minimum wages for workers, survival becomes an issue. On the other hand, acknowledging potential negative consequences (e.g. low working motivation, high work turnover, worker depression, undesirable behaviours) for workers who struggle with their basic living standards’ rising costs, is significant for organisations, so they can be proactive (rather than reactive). As discussed in Chapter 1, studies on negative approach emphasize on rectifying problems when it already occurred, as metaphors described by researchers that by that time companies become ‘repair shops’ (Keyes and Haidt, 2003, p. 6) to react to solve the problems like ‘repair the worst things’ (Seligman and Csikszentmihalyi, 2000, p. 5). A positive approach, focusing on finding and developing production workers’ strengths and determining their psychological capacity to overcome current challenges and build a forward-looking vision becomes urgent. It echoes the call by Wright (2003, p. 437) of ‘an idea whose time has truly come’, meaning it is time to switch from traditional negative approach to positive approach, but from a practical standpoint during an economic crisis.

In sum, facing the pressure of this difficult situation, companies must strive to keep their workforces stable, help their employees retain positive attitudes and behaviours, and encourage them to remain loyal to the firm. According to added value of POB as sustainable competitive advantage for company success discussed in Section 1.1, for any organisations, it is important to take a proactive approach to recognize and stimulate the positive strengths of their employees rather than remedy negative impacts after they occur in working places. Thus, the time has truly come to encourage positive behaviour in workplaces to achieve a sustainable competitive advantage.

5.3 Settings

As discussed in Section 5.2, low-income migrant workers are disproportionately affected by external inflation and declining incomes, which make it difficult for them to maintain a basic living standard for both their family back home as well as themselves in the cities. As a result, production workers experience low workplace motivation resulting in undesirable behaviours and a high level of work turnover. Such a situation presents challenges for firms determined to maintain stable workforces that are reasonably motivated and productive.

There were three manufacturing companies chosen for this research study. One company was my former employer where I worked as the human resource (HR) director for China before undertaking my doctoral studies. The other two companies were chosen from among my social networks. These three companies were selected for several reasons. Firstly, all three companies are typically characteristic of manufacturing in China, which has labour-intensive manufacturers with production workers as their main labour force. Therefore, the samples from these companies represent a significant segment of the manufacturing industry.

Secondly, all three companies hired typical ‘migrant workers’ from all over the country, following the pattern of all other manufacturing companies in China. The three companies employ more than 1,200 employees with approximately 1,000 production workers coming from 25 provincial-level divisions. China has a total of 34 provincial-level divisions, including 23 provinces, 4 municipalities (Beijing, Tianjin, Shanghai, and Chongqing), 5 autonomous regions (Guangxi, Ningxia, Xinjiang, Inner Mongolia, and Tibet), and 2 special administrative regions (Hong Kong and Macau). As few farmers reside in municipalities, the majority of migrant workers come from rural areas. Farmers from the three autonomous regions, including Xinjiang, Inner Mongolia, and Tibet, seldom come out of these areas to work in manufacturing probably, most likely due to the remote distance, and these areas’ cultures of minority nationality. Therefore, it is the 23 provinces and 2 autonomous regions that provide most of the production workers in China, with these three selected companies employing production workers who have migrated from these provinces and autonomous regions. This means the sample’s distribution of production workers geographically covers the entire country in those regions in which farmers are resident, except for areas of major cities or autonomous regions; hence, the sample is typical. Thirdly, all three companies share the same reporting route in production line (see Figure 5-1 and Photo 5-1): a production worker reports directly to his or her supervisor and the later reports to his or her line manager. A production line is grouped into different work stations (e.g. chipping group, soldering group, cutting group, assembling group) according to the activities in the pipeline design. There is one supervisor for each group, working with the production workers (usually sitting among the group members as a role model presenting standard processes of working). Normally a supervisor supervises more than eight production workers. Line managers are responsible for the groups’ daily production and management. Each production line has two line managers for day shift and night shift. Therefore, there is

always a line manager with a production line regardless of day or night shift. Normally a line manager manages five or more supervisors. Figure (5-1) presents the reporting matrix and Photo (5-1) shows the layout of a production line from one of the three companies. The photo visually distinguishes production workers, supervisors, and line managers: The first group is doing chipping in the line. The standing woman is the line manager. The woman in blue work uniform is supervisor. There are 12 production workers in this group. Fourthly, as discussed in Section 5.2, deeply affected by the economic downtown, manufacturing has been facing a difficult situation and must promote positive behaviour in the work environment, and these three companies are typical as well, in this regard.

Figure 5–2: Reporting matrix in production area

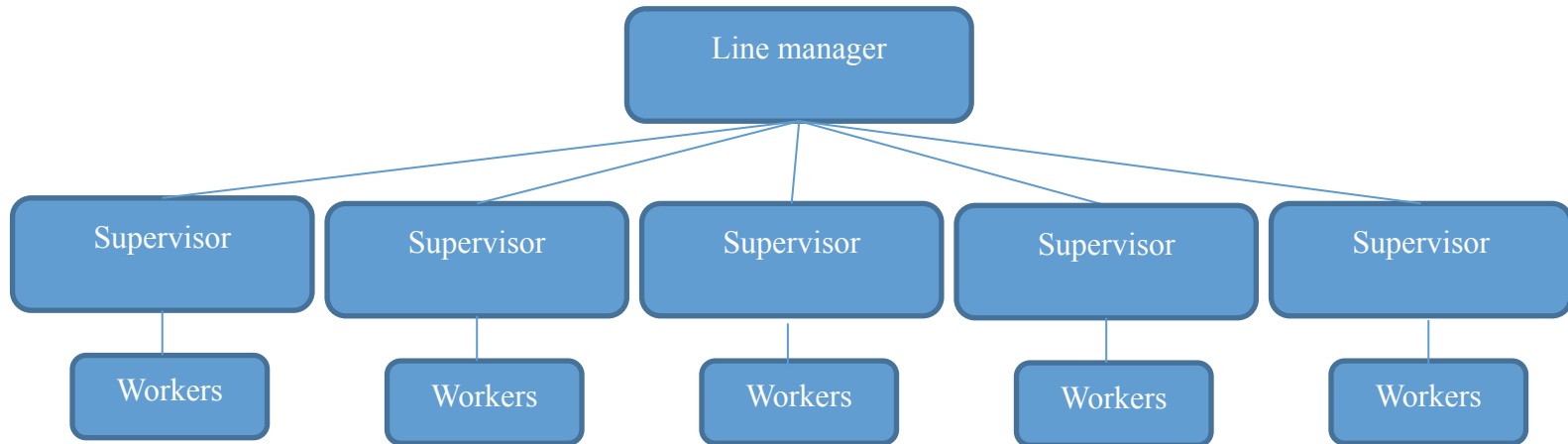


Photo 5–1: Layout of a production line



Most important, not only were we able to secure for our study these three companies that are typically characteristic, but also we were able to obtain three conditions highly desirable to complete a study of this nature: acceptances, access, and commitment from the target companies, all of which are preferable when conducting experimental intervention research in working places (Kristensen, 2005).

Specifically, these three companies accepted this study and gave me permission to conduct the survey in their workplaces. Before the survey, the researcher communicated with the chief executive officers (CEOs) to briefly introduce the research, and the CEOs showed their interest in survey participation. Then the author was invited to give a presentation to introduce the detailed survey plan and also addressed necessary requirements (must haves) and incentive schemes (optional, nice to have) for survey participation.

The CEOs accepted all necessary requirements including spending working hours on the survey and experimental intervention-related activities (e.g. communicating and administrating data collection; filling in surveys; PCI training); temporarily shutting down all manufacturing machines and facilities while the research was conducted; obtaining support from HR departments in distributing the questionnaires and administering the PCI training; using office facilities (e.g. copy machines, printers, meeting rooms); and providing me full access to facilities. For the optional incentive schemes, the CEOs provided various incentives (see Section 5.4), with one of the companies generously contributing 100 pens and an unlimited supply of copy paper. I was granted full access to company workplaces, their employees, their archives in HR, and other departments. For confidentiality, I also signed a written agreement pledging to keep all information confidential and use it only for research purposes.

All three companies were committed to give both the survey and the PCI training high priority. The CEOs believe their workplaces will benefit from participating in the survey and PCI training in both the short-term (e.g. it is, at least, an opportunity to acquire knowledge relevant to their business) and the long-term (e.g. promoting positive workplace behaviour). Because I bring 19 years of HR experience and, indeed, used to work in one of the three companies as a China HR director, the three companies believed in my capability to suggest improvements for their current HR systems. The CEOs promised not to require any individuals' reporting, and instead required that I produce a general report to help them improve their HR practices. Although the report required by the CEOs is not closely related to the research, I spent time preparing for it and delivering to the CEOs. I also provided gratis HR consultations. This exchange of benefits between me and companies ensured commitment to the survey.

5.4 Incentive schemes

Incentive theory has been supported by many behavioural psychologists who propose that individuals are motivated to engage in activities that are expected to be profitable (positive incentive); as a result, they are more likely avoid behaviours that are negatively received or punished (negative incentive). Incentive as motivation has been applied in various fields and industries. On the one hand, in business management, positive incentives are provided to stimulate greater action for the sake of expected work outcomes, including monetary rewards (e.g. performance-based bonus) or noncash rewards (e.g. job promotion, job satisfaction) or both. On the other hand, to rectify mistakes and unacceptable behaviours, negative incentives are also used, including penalties, job demotion, or even employment termination in serious cases. The theory of incentive has been applied in various fields, with evidence indicating it works to modify employee behaviour in the workplace. For example, using 215 hourly workers in a manufacturing facility, Pedalino and Gamboa (1974) reported that using lottery incentive pay reduced worker absenteeism.

Not only is incentive used in HR management guiding practice, it is also widely used as a strategy to increase response rates to questionnaires (e.g. Rose, Sidle, and Griffith, 2007) and attract participants to experimental research studies (e.g. Groeneveld, Proper, van der Beek, van Duivenbooden, and van Mechelen, 2008). For example, Rose et al., (2007) reported that incentives contribute to an increase in such response rates. Groeneveld et al., (2008), using a sample of 692 construction workers randomly allocated in the treatment and control groups, used lottery tickets as incentives to attract participation. According to Edwards, Roberts, Clarke, DiGuseppi, Pratap, Wentz, and Kwan (2002, p. 1183), five methods were identified as

increasing the response rate to postal questionnaires: monetary incentive; short questionnaires; personalized questionnaires with letters and coloured ink; contacting participants before sending questionnaires; and avoiding sensitive questions designed to be of greater interest to participants. In particular, their review found that using an incentive almost doubled the response rate's odds.

I introduced incentive schemes (see Table 5–3) for all three companies. Monetary and nonmonetary rewards had been promised as offers to participants, including free meals, additional overtime pay, and a lottery drawing. Firstly, the CEOs agreed that conducting surveys and PCI trainings is arranged during working hours. In the event of work responsibilities accumulated as a result of the research activities, production workers would have the chance to work extra hours to compensate for those hours spent on the research, leading to overtime pay. On the one hand, as introduced in Section 5.2, production workers want overtime opportunities, due to the higher-than-normal pay rate. Therefore, participating in the survey provides them opportunities to work overtime and in turn receive additional earnings. On the other hand, using working hours to carry out research activities can reduce the phenomenon of nonresponse significantly (Baruch, 1999), because under the current stressful work life, both production workers and management experience less time and motivation to spend on completing questionnaires (Peiperl and Baruch, 1997). Secondly, other specific incentives were also provided in the survey, which attract the respondents and make them feel more dedicated to participating. Two companies provided free meals to all production workers on the day of the survey and the PCI training. At the third company, which does not provide a free meal, I set up a lottery drawing, with a value of RMB 3,000. Rewards of daily necessities (e.g. shampoo, shower gels, teeth-brushing paste, laundry soap were presented at the entrance

to the production area as enticements to attract participations. The rule was that firstly, production workers who participated in the two rounds of survey were entitled to the lottery drawing reward. Secondly, the lottery drawing would take place after the completion of two survey rounds and the two waves of PCI training. Thirdly, 100% of entitled participants would have the chance to receive a gift from the daily necessities presented. These incentive rewards dramatically increased the interest of production workers' participation. Thirdly, as part of the survey procedure, a four-hour training course was designed to deliver to all supervisors in the PCI first and the control group after the second-round survey. The PCI group was given exercises to reinforce the practical application. For the supervisors, the learning opportunity increased their motivation to participate.

Table 5–3: Incentive schemes introduced in this study

Incentives	Company 1	Company 2	Company 3
Working hours	Yes	Yes	Yes
Overtime payment compensating survey/PCI training hours	Yes	Yes	Yes
Free meals	No, but lottery drawings instead	Yes	Yes
Lottery drawings	Yes		
PCI training opportunity	Yes	Yes	Yes

5.5 Measures

The main selection criteria used in determining measurement constructs are the instrument's psychometric characteristics and workplace relevance. Specifically, the measuring instruments selected must have acceptable reliability and discriminant validity. Reliability refers to consistency among the scales, with Cronbach alpha regarded as an inferior measure of

reliability (Hair, Anderson, Tatham, and Black, 1995). Alpha values of .7 or higher are considered acceptable (Nunnally, 1978). Validity indicates whether the instrument measures what it claims to measure. Response rate is also known as the completion rate and viewed as an important indicator of survey quality. High response rate indicates great credibility and validity of the result (Rogelberg and Stanton, 2007). Thus far, there is no agreed-upon norm as to what constitutes a reasonable response rate (Baruch, 1999; Baruch and Holtom, 2008). However, according to a review by Baruch and Holtom, (2008), using 463 published organisational studies that employed questionnaires in 2000 and 2005, the average response rate was around 50% at individual level, and around 40% at the organisational level.

This study uses well-established measurement constructs that have been extensively utilised in empirical publications and have revealed adequate internal reliabilities. Scales of authentic leadership, role modelling, PsyCap, and work competence have been developed and have validated the Anglo-Saxon cultural context, but some of them also have been utilised in the Chinese context, such as PsyCap (Luthans et al., 2005, 2008) and authentic leadership (Walumbwa, et al., 2008), and have demonstrated high alpha values. The scale of OCB that was utilised in this study was developed by Farh, Earley, and Lin, (1997), which validated the Chinese cultural context. For this reason, the appropriateness of the scales for the Chinese cultural context was considered. The Chinese version of PsyCap and the authentic leadership measurement are provided and authorized to use in this study by Luthans and his colleagues. The Chinese version of OCB was obtained by contacting the original author, and the reliability is rather high (alpha values of each of its dimensions being above .80) in this study by the author and his colleagues (Farh et al., 1997). For the rest of the measurements, including role

modelling and work competence, the author performed a translation–back–translation procedure to generate a workable Chinese version.

5.5.1 The translation–back–translation procedure

The original scales of role modelling and work competence were translated into Mandarin Chinese using Brislin (1970)'s back–translation methodology. Sepcifically, at first, the questionnaire was translated from the original language (English) into the Mandarin Chinese by me, who am bilingual. Next, the translated Chinese language version was back–translated and cross-checked by another individual who is a native Chinese linguist and who works as lecturer teaching English-Chinese translation at Durham University in the UK and who has no knowledge about the related subject. Finally, the two versions, the translated English and its original ones, were compared. Discrepancies were identified and resolved by mutual agreement between us (the lecturer and me). For example, we have generated slightly different translations for the two items of role modelling: ‘provides a good model for me to follow’, and ‘acts as a role model for me’. Both of us claimed there are similarities between these two items, and we think that we either make modifications in the English wording or eliminate one of them. We reached agreement on the final Chinese version to remain these two items but with a slight modification.

Therefore, by following the translation–back–translation procedure, semantic equivalence between the English and Chinese versions of the questionnaires should be preserved.

5.5.2 Pilot survey

The pilot survey was conducted by selecting 30 workers, 5 supervisors, and 3 line managers at random in one of the three companies. It was conducted for two reasons: Firstly, it is widely

acknowledged (e.g. Podsakoff et al., 2003; Spector and Brannick, 1995) that sound research methods can eliminate common method bias. Secondly, measurement construct is one of the sources known to cause common method bias, which accounts for 10% to 20% percent of the variance (Spector, 1994; Spector and Brannick, 1995). For example, item overlap is indicated to cause common method bias (Spector, 1987). Therefore, it is important to check whether there are any problems (e.g. item ambiguity, item overlap) of the measurement construct and whether respondents are able to reasonably interpret the meaning of the measurement construct.

Although the measurement constructs have been double-checked by bilingual lecturer at Durham University (see Section 5.5.1), this study have made the triple check using production workers as readers, because interpreting the measured variables depends upon not only researchers but also respondents. Thirdly, as researchers (e.g. Edwards et al., 2002) have suggested that questionnaire length affects response rate, determining an acceptable time frame for production workers to complete the questionnaires is necessary.

Participants in the pilot survey were led in a meeting room during working hours. It was explained to them that the purposes of the pilot survey were to check whether the questionnaires were understandable and to record how long it took to complete the questionnaire. They were asked to read through the questionnaires carefully as the first step. Their comments were recorded, and Table 5–4 summarises their typical comments and feedback. In the second step, they were encouraged to fill in the questionnaires, leaving the ambiguous or unfamiliar items blank.

Table 5–4: Summary of eliminating items based on feedback in pilot survey

Measurement construct	Items	Feedback from pilot survey
Role modelling	‘provides a good model for me to follow’	Same as ‘act as a role model for me’ in production worker report ‘I cannot see the difference’
OCB-protecting company resource	‘Conducts personal business on company time (e.g. trading stocks, shopping, going to barber shops)’	‘These behaviours have no chance in our manufacturing’
	‘Uses company resources to do personal business (e.g. company phones, copy machines, computers, and cars)’	Unfamiliar context in supervisor report
	‘Views sick leave as a benefit and makes excuse for taking sick leave’	

On the basis of pilot survey feedback, two items (see Table 5–4) of the measurement construct of role modelling appear ambiguous or greatly overlapped for production workers. The two descriptions of the leader who ‘provides a good model for me to follow’ and ‘act as a role model for me’ were very similar for the respondents. Typical comments from production workers include ‘they are the exact same meaning’ and ‘I cannot see the difference’. They said the latter is simpler and concise when asked to compare the two phrases. As a result, the former item was removed from the construct; thus, only four items instead of the original five were used as a measurement construct of role modelling.

In addition to improving the item scale by eliminating one item of role modelling, the measurement constructs of OCB were also modified. The original OCB scale from Farh et al., (1997) includes 20 items. However, in the pilot survey, one supervisor commented that all three items (see Table 5–4) related to protecting companies' resources are both very unfamiliar and irrelevant to Chinese culture. Typical reasons given were production workers have no chances to conduct personal business on company time, because popular practise dictates that personal belongings (e.g. mobile, handbag) are not allowed into production areas. Production workers have no opportunities to carry out nonbusiness activities in the production area. Normally, production workers are provided a safety locker to keep their belongings in while they are working. Moreover, sick leave is unpaid leave, leaving no advantage for a production worker to take. As a result, these three items were removed from the measurement construct, because the description of how production workers can protect company resources in this manner is unfamiliar in the manufacturing environment in China.

In sum, the measurement construct of role modelling was modified by removing one item of role modelling and three items of OCB. Scale items of authentic leadership, PsyCap, and work competence remain as in the original, because pilot survey feedback indicated those items were clear and understandable, with no changes needed. The details of the final measurement are discussed in the following Section 5.5.3. According to the observation period, the time to complete the production workers' questionnaire was about 25 minutes, 10 minutes for a supervisor to rate the questionnaire for one of the subordinates, and 10 minutes for line managers to rate the questionnaire for one team. After improving the measurement items based on pilot survey feedback, both the measurement construct and questionnaire length can be

assumed to be applicable. Therefore, both good response rate and measurement validity can be predicted.

Measurement constructs and a data source are presented in Table 5–5, which indicates the studies from which the items have been adopted, items themselves, and the sources of data.

Table 5–5: Scale of studied variables

	Variables	Original scales	Original items	Final items	reference	Rater
1	Authentic leadership Questionnaire (ALQ)	0–4	16	16	Walumbwa et al., 2008	Worker
2	Role modelling	1–7	5	4	Rich, 1997	Worker
3	PsyCap	1–6	24	24	Luthans et al., 2007a	Worker
4	work competence	1–7	5	3	Heilman et al., 1992	Supervisor
5	OCB	1–7	20	17	Farh et al., 1997	Supervisor
6	Team work competence	1–7	5	3	Heilman et al., 1992	Line manager

5.5.3 Measurement Constructs

5.5.3.1 Authentic leadership

Authentic leadership (see Table 5–5) was measured using the 16-item authentic leadership questionnaire (ALQ), originally from Walumbwa et al., (2008). I received permission to use the ALQ as well as its original measure in both the English and the Chinese versions, after registering a free license only for student researchers at the website www.mindgarden.com. The original instrument is a 5-point Likert-type scale, with responses ranging from 0 (‘not at all’) to 4 (‘frequently, if not always’). There are four aspects of this measurement construct: relational transparency (five items, e.g. ‘Says exactly what he or she means’, and ‘Admits mistakes when they are made’), internalized moral perspectives (four items, e.g. ‘Demonstrates beliefs that are

consistent with actions’, and ‘Makes difficult decisions based on high standards of ethical conduct’), balanced processing (three items, e.g. ‘Solicits views that challenge his or her deeply held positions’, and ‘Analyses relevant data before coming to a decision’), and self-awareness (four items, e.g. ‘Seeks feedback to improve interactions with others’, and ‘Accurately describes how others view his or her capabilities’).

In the stage of data analysis, I retained the original scale of 5-point Likert-type scale but recoded it to range from 1 (‘not at all’) to 5 (‘frequently, if not always’). This was done to avoid the risk of confusing whether a zero is a true figure describing authentic leadership or a code denoting missing data, since using code ‘zero’ to denote missing data is a popular practice when doing primary data analysis. Other researchers may have the same concern as me and they made the same recoding. For example, the study by Walumbwa et al., (2011) edited the scales of authentic leadership from 1 (‘not at all’) to 5 (‘frequently, if not always’).

The four-component model of ALQ has been subsequently operationalized and validated by authentic leadership researchers (Gardner et al., 2011). Previous publications using this 16-item ALQ demonstrated good internal reliability. For instance, the study by Walumbwa et al., (2011), using a sample of 146 intact groups from the financial industry, used the English version to ask participants to rate the authentic characteristics of their supervisors. Their study reported Cronbach’s alpha for measuring authentic leadership were .83. The Chinese version has been used in this study by Walumbwa et al., (2008), as Cronbach’s alpha values for the Chinese samples were .87, .76, .81, and .92 for relational transparency, internalized moral perspective, balanced processing, and self-awareness, respectively.

This study demonstrated very high reliability as well. Cronbach's alpha values for measuring authentic leadership at individual level were .82 and .86 for Time 1 and Time 2 (sample size = 620). This study utilised an aggregation approach to measure the team-level authentic leadership by aggregating each production workers' rating for each item of authentic leadership, then calculating the mean. Therefore, the unit-level measures of authentic leadership were the means of their individual values in the group. Cronbach's alpha values for measuring authentic leadership at team level were .90 and .91 for Time 1 and Time (sample size = 87).

5.5.3.2 Role modelling

Role modelling (see Table 5–5) was assessed using Rich's (1997) measure. Originally, there were five items in a 7-point Likert-type scale ranging from 1 to 7 ('strongly disagree', 'moderately disagree', 'somewhat disagree', 'somewhat agree', 'agree', 'moderately agree', 'strongly agree'). Two sample items were: 'My leader leads by example', and 'My leader exhibits the kind of work ethic and behaviour that I try to imitate'. This measure has been used in previous studies and demonstrated high reliability. For example, Cronbach's alpha values using this measure were all above .92 in studies by Bush et al., (2001) and Bush et al., (2004)

However, this study retains only four of the original five items. As noted above, one item, 'provides a good model for me to follow', was removed. This item was eliminated based on pilot survey feedback (discussed in Section 5.5.2) and the translation–back–translation process (discussed in Section 5.5.1), suggesting that it held the same meaning as 'act as a role model for me'.

This study utilised an aggregation approach to measure the team-level role modelling by aggregating each production workers' rating for each item of role modelling then calculating

the mean. Therefore, the unit-level measures of role modelling were the means of their individual values in the group. The final four-item scale demonstrated acceptable reliability, yielding Cronbach's alphas of .77 and .80 for Time 1 and Time 2 individual levels (sample size = 620), and .85 and .88 for Time 1 and Time 2 team levels at (sample size = 87).

5.5.3.3 *PsyCap*

PsyCap (see Table 5-5) was assessed with a scale based on the Luthans et al., (2007a) measurement, which has been extensively utilised in empirical research in the positive organisational behaviour field. The scale of Luthans et al., (2007a) consists of 24 items in a 6-point Likert-type scale, ranging from 1 ('strongly disagree') to 6 ('strongly agree') that assess PsyCap with 6 items in each of the following four dimensions: self-efficacy ('I feel confident analysing a long-term problem to find a solution'), hope ('If I should find myself in a jam at work, I could think of many ways to get out of it'), resilience ('I usually take stressful things at work in stride'), and optimism ('I always look on the bright side of things, regarding my job').

Earlier studies using this 24-item PsyCap measure demonstrated excellent internal reliabilities (e.g. Avey, et al., 2009; Clapp-Smith et al., 2009; Luthans et al., 2007a). For instance, Luthans et al., (2007a) report the reliability of the entire version of PsyCap is .88, .89, .89, .89 for their four samples, Sample 1 in Study 1 (167 management students), Sample 2 in Study 1 (404 different management students), Sample 3 in Study 2 (115 engineers and technicians), and Sample 4 in Study 2 (114 employees in all functions from insurance services firm). There is a shortened version of PsyCap questionnaire consisting of only 12 items out of the original 24 items, which has been used in some published studies (e.g. Luthans et al., 2008). However, findings indicate that the 24-item PsyCap questionnaire demonstrated a better measurement of reliability than the shortened versions did. As PsyCap is a core variable in the study, I used the

original 24-item scales to ensure better reliability and validity than compared with the 12-item scale. I received permission to use the scale of the PsyCap measure as well as the original PsyCap measure in both the English and the Chinese versions, after registering a free license only for student researchers at www.mindgarden.com.

PsyCap was originally designed to measure individuals' PsyCap, but evidence indicates that it also can be used to measure the team-level PsyCap as a unit using referent-shift model. Referent-shift model focus on the aggregate when answering items and it has been used in unit-level studies for long time (Chan, 1998). The study by Walumbwa et al., (2011) also used referent-shift model to edit items' contents to measure group-level PsyCap. They asked group members to rate the team's PsyCap using 'members of this group' to replace 'I' and the reference within the statement was also edited accordingly, such as using 'the group' to replace 'the company'. Sample items in their study include: 'Members of this group confidently contribute to discussions about the group's strategy', and 'Members of this group think of many ways to reach work goals'. Their study only used 8 items out of the original 24 items, and also changed the original 6-point Likert-type scale to a 5-point one. Cronbach's alpha for measuring group-level PsyCap in their study is .79.

This study utilised an aggregation approach to measure the team-level PsyCap by aggregating each production workers' rating for each item of PsyCap, then calculating the mean. Therefore, the unit-level measures of PsyCap were the means of their individual values in the group. The scale of PsyCap demonstrated very high internal consistency reliability. The Cronbach alphas for the measure of PsyCap were .78 and .81 for individual level at Time 1 and Time 2 (sample size=620), .83 and .88 for team level at Time 1 and Time 2 (sample size=87).

5.5.3.4 Work competence

The original work competence measurement (see Table 5–5) developed by Heilman et al., (1992) includes five items with a 9-point Likert-type scale, which has been used in previous studies and has demonstrated acceptable reliabilities (Luthans et al., 2005, 2008; Walumbwa et al., 2010a; Youssef and Luthans, 2007). This study used only 3 items of the original 5 items because the rest of 2 items describes overlapping texts. This study also changed the original 9-point Likert-type to a 7-point one ranging from 1 ('very poor') to 7 ('very good'). Each item's criteria represent one assessment of overall competency, quality, and quantity. Production workers' on-the-job competence was rated by their direct supervisors. Some sample items asked of the individual were: 'How competently does this individual perform the job?', and 'How would you judge the overall quality of this individual's work?'. Team-level work competence was rated by the line manager. This study used referent-shift skill to rate team-level work competence. Some sample items for teams were: 'How would you judge the overall quality of this team?', and 'How effectively does this team get their work done?'. Different data sources used to measure work competence should help to control for common method bias (Podsakoff et al., 2005).

The final three-item scale demonstrated acceptable internal consistency reliability, as it yielded Cronbach's alphas of .80 and .86 for Time 1 and Time 2 individual levels (sample size = 620), and .72 and .71 for Time 1 and Time 2 team levels (sample size = 87).

5.5.3.5 OCB

OCB (see Table 5–5) was assessed with a scale based on the Farh et al., (1997) measurement. The original OCB scale consists of 20 items using a 7-point Likert-type scale ranging from 1 ('strongly disagree') to 7 ('strongly agree'). The five dimensions in this measure included

identification with the company (four items), altruism toward colleagues (four items), interpersonal harmony (four items), protecting company resources (four items), and conscientiousness (five items).

Sample questions include: 'Eager to tell outsiders good news about the company and clarify their misunderstandings' (identification with the company), 'Willing to assist new colleagues to adjust to the work environment' (altruism toward colleagues), 'Often speaks ill of the supervisor or colleagues behind their backs' (interpersonal harmony), 'Conducts personal business on company time (e.g. trading stocks, shopping, going to the barber shop)' (protecting company resources), and 'Often arrives early and starts to work immediately' (conscientiousness). The Farh et al., (1997) study developed an indigenous OCB measure by exploring variations in citizenship behaviour and focusing on interpersonal relationships within the Chinese context, making it a good choice for this study. It is particularly relevant in Chinese society, because of the emphasis people place on relationships, as well as the devotion they feel toward their in-group and organisation (Bond and Hwang, 1987). This responds to the call of Van Dyne et al., 1994) that the nature of relationships and ties in a culture is important, and that it is not simply the enactment of specific organisational practices. Moreover, the results accord with the original 5-factor model consisting of the original 20-item Chinese OCB scale. Their study reported that Cronbach's alpha values of each dimension are: identification with the company (.87), altruism toward colleagues (.87), interpersonal harmony (.86), conscientiousness (.82), and protecting company resources (.81).

As noted above, the factor of protecting company resources (consisting of three items) was eliminated in this study, because pilot survey feedback indicated the described context was

unfamiliar in manufacturing companies in China (discussed in Section 5.5.2). Sample eliminated items include: ‘Uses company resources to do personal business (e.g. company phones, copy machines, computers, and cars)’, and ‘Views sick leave as a benefit and makes excuses for taking sick leave’. Supervisors commented that questions regarding protecting company resources are irrelevant to their workplaces, because such behaviour rarely happens in China’s manufacturing operations. As a result, this study retains only 17 items of the original 20 items, with the 3 items measuring the level of protecting company resources removed. The final 17-item scale demonstrated high internal consistency reliability. Team level measure of OCB was created in the same way as aggregation of authentic leadership, role modelling, and PsyCap, aggregating each supervisor’s rating for each item of OCB then calculating the mean. Therefore, the unit-level measures of OCB were the means of their individual values in the group. Cronbach’s alphas are .84 and .84 for Time 1 and Time 2 individual levels (sample size = 620), and .88 and .86 for Time 1 and Time 2 team levels (sample size = 87).

5.5.4 Justification for aggregation

To justify the aggregation of individual-level measures to the team level, statistical evidence must be provided (Gully, Incalcaterra, Joshi, and Beaubien, 2002). There are some rules of thumb statistical criteria recommended by researchers (e.g. Beal, Daniel, and Dawson, 2007; Bliese 2000; James 1982, 1988; James, Demaree, and Wolf, 1984, 1993; LeBreton, James, James, and Lindell, 2005; LeBreton, James, and Senter, 2008). Table 5–6 presents the summary of recommendations to support aggregation. In general, three indices, r_{wg} , CII(1), and CII(2), examining both between-group differences and within-group agreement, has been recommended, including calculations of. In addition, statistical criteria to justify the aggregation have been suggested, which is discussed as follows.

Table5–6: Summary of ‘rules of thumb’ criterial for aggregation justification

	Measure	Criteria
Within-group agreement	$r_{wg} (j)$ Each group has one value of rWG	$r_{wg} > .70$ (The median r_{wg} across groups) .70 < $r_{wg} \leq .90$ indicating strong agreement; .90 < $r_{wg} \leq 1.00$ indicating very strong agreement;
between-group differences: intra-class correlation coefficient	CII(1) reliability of score within group	CII(1) > .20
	CII(2) reliability of mean group score	CII(2) > .70

5.5.4.1 Within-group agreement: $r_{wg} (j)$

r_{wg} assesses agreement within each group with respect to their ratings on a common scale (James et al., 1984, 1993;). As a result, each group should have one value of r_{wg} . A good within-group agreement indicates “reasonable” observed variance across raters, which is that the within group variance is much smaller than the variance when raters are randomly rating. According to recommendation summarized in Table5–6, two criteria must be met for a good within-group agreement: first, the median r_{wg} across groups should be higher than .70. Specifically, r_{wg} value of higher than .70 indicates a strong agreement within the group and higher than .90 as very strong agreement; second, the percentage of groups’ r_{wg} higher than .70 should be as high as possible.

To test within-group agreement, this study calculates r_{wg} for each team and results are presented in Table (5–7). The mean r_{wg} of AL across the 87 teams was 0.88, with 92% groups’ r_{wg} higher

than .70. The mean r_{wg} statistics for XRM, XPSY, and XOCB were .79, .95, .97 and the percentages of groups' r_{wg} higher than .70 were 79%, 100% and 100%, respectively. The high degree of r_{wg} in this study suggests high level of agreement about authentic leadership, role modeling behavior, psychological capital and organizational behavior within a team. These statistics indicate high within-group agreement, meeting the rules of thumb criterion for aggregation justification. Therefore the results justify that it was appropriate to aggregate the data at the unit level.

5.5.4.2 Between-group differences: ICC(s)

James (1982, 1988) recommended two intra-class correlations coefficients (ICCs) for assessing between-group difference. ICC(1) indicates the extent of group differences among ratings from members of the same group. ICC(2) assesses the overall reliability of group means, indicating whether groups can be differentiated on the variables under investigation. According to recommendation summarized in Table 5–6, values greater than .20 for ICC(1) and .70 for ICC(2) are typically used to justify aggregation.

To test between-group differences, this study calculates ICC(1) and ICC(2). For AL, the ICC(1) value was .29, indicating that approximately 29% of the variance is attributable to group differences, a substantial amount. For XRM, XPSY and XOCB, the ICC (1) value was .30, .28, .46, respectively, all indicating a substantial amount of between-group differences. The value of ICC (2) for AL, XRM, XPSY and OCB was .97, .97, .97, and .98, respectively. These statistics all exceed the recommended value of .20 for ICC (1) and .70 for ICC(2), suggesting statistical appropriateness for aggregation and that there is variance to be modelled.

Table 5–7: r_{wg} , team level (N=87)

Group	AL	XRM	XPSY	XOCB	Group	AL	XRM	XPSY	XOCB	Group	AL	XRM	XPSY	XOCB
1	0.9169	0.4075	0.9844	0.9632	31	0.8335	0.2449	0.9709	0.9640	61	0.8969	0.8322	0.9345	0.9661
2	0.9088	0.9336	0.9775	0.9636	32	0.9013	0.4395	0.9776	0.9636	62	0.9269	0.8520	0.9795	0.9635
3	0.9278	0.9690	0.9598	0.9646	33	0.9307	0.7332	0.9626	0.9645	63	0.9554	0.8987	0.9579	0.9648
4	0.9112	0.9730	0.9839	0.9632	34	0.8847	0.9134	0.9622	0.9645	64	0.9269	0.8990	0.9422	0.9656
5	0.6879	0.8814	0.9669	0.9642	35	0.9412	0.8387	0.9577	0.9648	65	0.8389	0.9032	0.9712	0.9640
6	0.9704	0.8571	0.9408	0.9657	36	0.7575	0.8261	0.9606	0.9646	66	0.8497	0.9328	0.9558	0.9649
7	0.9536	0.9524	0.9408	0.9657	37	0.9561	0.8627	0.9791	0.9635	67	0.9656	0.9262	0.9692	0.9641
8	0.9095	0.9545	0.9062	0.9676	38	0.9028	0.7132	0.9088	0.9675	68	0.9100	0.9197	0.9701	0.9640
9	0.8973	0.7103	0.9673	0.9642	39	0.6765	0.8918	0.9402	0.9658	69	0.9101	0.9256	0.9833	0.9633
10	0.9477	0.9815	0.9823	0.9633	40	0.9505	0.5301	0.9739	0.9638	70	0.9187	0.4444	0.9472	0.9654
11	0.9319	0.6829	0.9770	0.9636	41	0.9199	0.8682	0.9705	0.9640	71	0.9163	0.2299	0.9719	0.9639
12	0.9007	0.6797	0.9388	0.9658	42	0.9536	0.9383	0.9622	0.9645	72	0.9323	0.9543	0.9744	0.9638
13	0.8241	0.5253	0.9705	0.9640	43	0.9178	0.4121	0.9493	0.9652	73	0.9315	0.7318	0.9637	0.9644
14	0.9039	0.9797	0.9775	0.9636	44	0.9158	0.8622	0.9565	0.9648	74	0.9198	0.8738	0.9826	0.9633
15	0.7759	0.7813	0.9598	0.9646	45	0.9341	0.8211	0.9529	0.9650	75	0.8746	0.8571	0.9520	0.9651
16	0.9355	0.8571	0.9774	0.9636	46	0.7350	0.6123	0.9379	0.9659	76	0.9211	0.8369	0.9461	0.9654
17	0.9557	0.9440	0.9818	0.9634	47	0.8772	0.9604	0.9540	0.9650	77	0.9420	0.9120	0.9650	0.9643
18	0.7911	0.8814	0.9028	0.9678	48	0.9632	0.7869	0.0000	1.0000	78	0.8339	0.9129	0.9434	0.9656
19	0.9536	0.8736	0.9833	0.9633	49	0.8995	0.8228	0.9357	0.9660	79	0.9458	0.8571	0.9080	0.9675
20	0.6233	0.7536	0.8830	0.9689	50	0.9666	0.9268	0.9610	0.9646	80	0.9609	0.8302	0.9441	0.9655
21	0.9412	0.8000	0.9723	0.9639	51	0.6798	0.8877	0.9718	0.9639	81	0.4953	0.6203	0.9689	0.9641
22	0.9376	0.9730	0.9662	0.9643	52	0.8534	0.8068	0.9500	0.9652	82	0.8473	0.8382	0.9599	0.9646
23	0.8031	0.9032	0.9866	0.9631	53	0.7749	0.6722	0.9745	0.9638	83	0.8341	0.6126	0.9395	0.9658
24	0.6411	0.6714	0.9542	0.9650	54	0.9158	0.7731	0.9849	0.9632	84	0.9472	0.8918	0.9546	0.9649
25	0.8987	0.7930	0.9584	0.9647	55	0.8421	0.8889	0.9827	0.9633	85	0.9766	0.8758	0.9859	0.9631
26	0.7992	0.6222	0.9737	0.9638	56	0.7619	0.8997	0.9775	0.9636	86	0.9173	0.7913	0.9583	0.9647
27	0.9777	0.8413	0.9282	0.9664	57	0.9477	0.9754	0.9909	0.9628	87	0.7966	0.6984	0.9527	0.9650
28	0.7605	0.7731	0.9500	0.9652	58	0.6171	0.9072	0.9678	0.9642					
29	0.8645	0.0000	0.9676	0.9642	59	0.9024	0.9064	0.9620	0.9645					
30	0.9065	0.0721	0.9070	0.9676	60	0.7816	0.9154	0.9136	0.9672					
	AL	XRM	XPSY	XOCB										
Mean	0.8719	3.1097	3.0143	3.5564										
Median	0.9100	0.8571	0.9622	0.9645										
N_	80	69	87	87										
values >.70	92%	79%	100%	100%										

5.5.5 Reliabilities

Cronbach's alphas for the constructs measured at two survey rounds in this study were computed and reported above (Section 5.5.4). Variables are shown in the following tables will be further examined. At individual level (Table 5–8), Cronbach's alpha values are: authentic leadership (AL) for Time 1 (.82), role modelling (XRM) for Time 2 (.80), PsyCap (XPSY) for Time 2 (.81), work competence(XCP) for Time 2 (.86), and XOCB for Time 2 (0.84); and at the team level (Table 5–9): authentic leadership (AL) for Time 1 (0.90), role modelling (XRM) for Time 2 (0.88), PsyCap (XPSY) for Time 2 (0.88), work competence (XLCP) for Time 2 (.71) and XOCB (0.86). The results demonstrated excellent reliability, as all scales are significantly above the commonly used threshold benchmark alpha value of 0.7 (Hair et al., 1995; Nunnally, 1978).

Table 5–8: Descriptive statistics and correlations, individual level

	<i>Mean</i>	<i>SD</i>	AL	XRM	XPSY	XCP	XOCB
AL	3.29	0.49	0.82				
XRM	5.13	0.93	0.29***	0.80			
XPSY	4.32	0.43		0.36***	0.81		
XCP	5.72	0.75		0.21***	0.37***	0.86	
XOCB	5.41	0.57		0.16***	0.27***	0.63***	0.84

*** $p < 0.001$ level (two-tailed); ** $p < 0.01$ level (two-tailed); * $p < 0.05$ level (two-tailed).

Table 5–9: Descriptive statistics and correlations, team level

	<i>Mean</i>	<i>SD</i>	AL	XRM	XPSY	XLCP	XOCB
AL	3.31	0.30	0.90				
XRM	5.13	0.55	0.40***	0.88			
XPSY	4.31	0.24		0.47***	0.88		
XCP	5.90	0.57	.28**	0.79***	0.63***	0.71	
XOCB	5.37	0.39		0.28**	0.38***	0.49***	0.86

*** $p < 0.001$ level (two-tailed); ** $p < 0.01$ level (two-tailed); * $p < 0.05$ level (two-tailed).

5.6 Survey procedures and schedule

This study followed procedures and a schedule (for details, see Table 5–10):

- Weeks 1–2: First-round survey in Companies 1, 2, and 3, sequentially
- Weeks 3–4: PCI training for the PCI group in Companies 1, 2, and 3, sequentially
- Weeks 5–8: Follow-up take-home exercise to reinforce PCI training in Companies 1, 2, and 3, sequentially
- Weeks 9–10: Second-round survey in Companies 1, 2, and 3, sequentially (Surveys were completed!)
- Weeks 11–14: Lottery drawings in Company 1; Providing general reports to CEOs; Providing gratis HR consultations.
- Weeks 15–16: PCI training as placebo for the control group in Companies 1, 2, and 3, sequentially

Table 5–10: Survey schedule and procedures

Process	Time and Place	Participants	Company 1	Company 2	Company 3
First-round survey	Time	Production workers	Week 1	Week 1	Week 2
		Supervisors	Week 1	Week 1	Week 2
		Line managers	Week 1	Week 1	Week 2
	Location	Production workers	Production area	Conference room	Canteen
		Supervisors	Conference room	Conference room	Conference room
		Line managers	Conference room	Conference room	Conference room
Randomisation allocation	Time	Supervisors	Week 3	Week 3	Week 3
Experimental intervention: PCI training, first wave	Time	Supervisors	Week 3	Week 3	Week 4
	Location	Supervisors	Training room	Training room	Training room
Follow-up take-home exercise	Time	Supervisor in PCI group	Weeks 5–8	Weeks 5–8	Weeks 5–8
	Location	Supervisor in the PCI group	Production area/ Conference room	Production area/ Conference room	Production area/ Conference room
Second-round survey	Time	Production workers	Week 9	Week 9	Week 10
		Supervisors	Week 9	Week 9	Week 10
		Line managers	Week 9	Week 9	Week 10
	Location	Production workers	Production area	Conference room	Canteen
		Supervisors	Conference room	Conference room	Conference room
		Line managers	Conference room	Conference room	Conference room
Placebo: PCI training second wave	Time	Supervisor and line managers*	Week 15	Week 15	Week 16
	Location		Training room	Training room	Training room

* Supervisor and line managers: refers to supervisors and line managers who have not participated in the first wave of PCI training.

5.6.1 First – round survey administration

The survey's target respondents include production workers, supervisors, and line managers. Production workers who had been with the organisation for more than three months (before March 1, 2010) were targeted for the study's first-round survey, because evaluating both production workers' specific work competence and contextual performance (e.g. OCB), plus garnering feedback on leaders' role modelling and leadership require several months to become established. A one-page cover letter related to the survey was sent to all production workers, supervisors, and line managers clarifying the purpose of the academic research, the proposed schedule, procedures to be undertaken, who was eligible to participate (a three-month tenure with the company), instructions for completion, incentive schemes, and a call for voluntary participation.

The questionnaire for production workers was four pages in length. Each questionnaire was marked with a code, which was assigned to the specific person by me. This code was unique and identical for the employees (e.g. TA0001 for Company 1; S0001 for Company 2; U0001 for Company 3). I acquired a master name list produced by the HR records of the three companies, indicating personnel information (e.g. age, education, marital status) of each production workers, as well as the name of the direct supervisor. This effort makes linking respondents' names with their responses difficult. The completed questionnaires were matched with HR records for the collection and double-checking of personnel information.

There were two shifts of production workers surveyed in the production area on the same day according to their working hours (either day or night shift). Therefore, one shift could not share its opinion of the survey with the other, with each shift of respondents completing its

questionnaires independently. Questionnaires were collected within a 45-minute cut-off point, which allowed participants enough time to complete their answers, according to the benchmark of the 25-minute completion time observed in the pilot survey. Production machines were stopped while production workers gathered in an unused space (e.g. production area, conference room, or canteen), according to the capacity of the space and working shifts. I started by explaining the study's purpose and reiterated the information provided in the one-page cover letter. Production workers were informed there were no right or wrong answers, and that participation was voluntary. HR assistants distributed questionnaires to all target production workers according to the marked employee code. Production workers who had been with the organisation for more than three months (before March 1, 2010) received a questionnaire marked with a code, but they were duly informed it was their choice whether or not they responded to the questionnaire, and handing it in once it was completed was voluntary. One company donated 100 pens, which were placed on a table for use freely by the participants. I recorded the time and asked the HR assistants to start collecting questionnaires when the time was up. Questionnaires were returned to me immediately. It was observed that the majority of production workers completed their questionnaires in 25 minutes.

It is believed that supervisors and line managers, respectively, would be able to evaluate work competence and OCB of individual and team levels more accurately than self-ratings (e.g. Donaldson and Grant-Vallone, 2002; Podsakoff et al., 2003). There were two shifts of supervisors' survey and line managers' survey administrated in the conference rooms immediately following the production workers' survey. For the supervisors' survey, supervisors were invited to a conference room to rate the work competence and OCB of each of the workers reporting directly to them. For the line managers' survey, line managers were invited to a

separate conference room to rate the work competence and OCB of the teams under each production line that they led. Therefore, each supervisor and line manager had no chance to share their survey responses with either production workers or their peers, ensuring independent responses. I set no cut-off time in administering the supervisor and line manager surveys, because it was a short, one-page questionnaire, and completion time depended on the number of their direct reports. Completion time varied between 20 and 60 minutes for the supervisor ratings, and between 10 and 45 minutes for the line manager ratings.

The distribution of the questionnaire was scheduled sequentially among the three companies, because I needed to physically go to each company to conduct the data collection. Regardless of different schedules and locations, the distribution followed the same process throughout the three companies. It is hoped that by maintaining consistency and systematic procedures throughout the process, common method bias by eliminating error variance produced by any random errors of measurement was reduced (Spector and Brannick, 1995).

The first round of data collection was completed in the first two weeks. The number of production workers in these three companies was 1,011, but only 805 of them satisfied the criteria of the minimum 3-month tenure. Out of this group, 206 (1,011 minus 805) were newly hired (less than a 3-month tenure with the company), indicating high work turnover, reflecting the negative impacts occurring during the manufacturing crisis in China (discussed in Section 5.2).

5.6.2 Randomised controlled trials (RCT)

A randomised controlled trial (RCT) is an experimental research method in which individuals are allocated randomly into two groups; therefore, each individual has the same chance of being

assigned to each group under the study. Random allocation more readily assures a balanced sample of individuals with similar characteristics between two groups, thus reducing the risk of influence from known and unknown factors (Stolberg, Norman, and Trop, 2004, p. 1540). One group receives experimental intervention (treatment group), and the other group is given either placebo treatment (e.g. training irrelevant to the research topic under the study) or no treatment at all (control group). RCT originated in clinical trials and medical research and has become the most powerful experimental study method in this area (Rychetnik, Frommer, Hawe, and Shiell, 2002; Stolberg et al., 2004). Reviews (e.g. Martin, Sanderson, and Cocker, 2009; Sims, 1997) have reported that in recent years, RCT has witnessed growth in the social sciences, such as in changing human behaviour and managing stress by interventions.

This study used RCT as one of the methodological strategies. Firstly, this study is an experimental research aiming to intervene supervisors' PsyCap. RCT is regarded as the basic methodological strategy for intervention research (Groeneveld et al., 2008; Kristensen, 2005). RCT can avoid the possible risk of selection bias (Kristensen, 2005; Rychetnik et al., 2002; Stolberg et al., 2004). Secondly, this study aims to test causal hypotheses whether intervening supervisors' PsyCap leads to positive outcomes of their production workers. RCT is the best design for determining causality testing (Rychetnik et al., 2002). Specifically, the difference between what happened in the treatment group and what would have happened in the control group without intervention indicates the effect of the intervention.

Randomisation allocation was administered in the following manner: Participants in PCI training were randomly selected from the master name list provided by HR. The letters 'A' and 'B' were assigned in sequential order to each supervisor, with names displayed in the master

name list. Supervisors who were assigned the letter 'A' formed the PCI group; whereas supervisors assigned the letter 'B' were in the NPCI group.

Blinding refers to a situation where participants are prevented from knowing certain information that may somehow influence them. Blinding is often used to control observation bias. A placebo in this study means the procedure- i.e. the second wave of PCI training, is objectively without specific activity for the condition being treated. Providing a placebo for the control group is also suggested to control bias, because unblinded RCTs tended to be biased toward beneficial effects, such as ascertainment and observation bias (Wood, Egger, Gluud, Schulz, Jüni, Altman, and Sterne, 2008). However, researchers also acknowledge (e.g. Groeneveld et al., 2008; Kristensen, 2005; Stolberg et al., 2004) that blinding or the use of placebo is often infeasible. Like all PsyCap intervention studies (e.g. Luthans et al., 2006, 2008, 2010), this study makes blinding impossible. Neither the researcher nor survey assistants could be fully blinded in this study. I conducted data collection, randomisation allocation, and PCI training. The survey assistants supported the administration work in all of the research activities. As a result, these people know which members were involved in the treatment group.

This study uses placebo for the control group. The control group was informed they would be given the same PCI training after the second round of survey. Therefore, this arrangement provides a certain blinding effect, because participants do not really know which group is under treatment, as everyone has the chance to attend the PCI training, regardless of different schedules. This reduced the risk of the halo effect that the production workers under treatment group might feel that their supervisors received special treatment over the supervisors in the control group, which might have influenced their ratings regarding their supervisors. Moreover,

this study also provides a certain blinding at the stage of assessing questionnaires. Specifically, I was blinded when inputting data, because returned questionnaires were marked only with a code, and had no employee name or intervention status. Finally, due to multiple sources of data, the risk of ascertainment and observation bias was reduced.

Supervisors who had more than three direct reports who had been with the company for more than three months (before March 1, 2010) were targeted for PCI training. Therefore, the randomisation allocation was carried out among them, because small team size may lead to a biased conclusion. There were only 89 of 104 supervisors, total, who satisfied the criteria. All supervisors were told that there would be two waves of PCI training – some of them were arranged in the first wave (intervention group or PCI group) and the rest in the second wave several (control group or NPCI group) weeks later. In other words, each of them was aware of the equal treatment in the PCI training, with the only difference being the time frame. This study randomly selected about half (43) the supervisors for intervention groups (PCI groups) who participated in the training in the first wave, leaving the rest (44) of the supervisors as control groups (NPCI groups) who participated in the training in the second wave. Only 39 supervisors were able to attend the first wave of training, however, and complete the PCI training course (see Section 5.6.3). As a result, the valid number of participants is 39 in the PCI and 48 in the NPCI group.

5.6.3 PCI training

The PCI training session was conducted soon after the first-round survey. This study followed the same processes and procedures of PCI training (discussed in Chapter 3) from publications (e.g. Luthans et al., 2006, 2008, 2010). This procedure is designed to affect each component of PsyCap and in turn the overall psychological capital. Empirical evidence shows that the PsyCap

intervention procedure is effective in both face-to-face intervention (e.g. Luthans et al., 2010) and via a website-based training course (Luthans et al., 2006; 2008b). The publications, however, do not make their training materials readily available; therefore, I designed customised training materials to facilitate PCI training portion of this study.

Training material must be customised. Firstly, a couple of steps were designed to affect the four dimensions of PsyCap, according to the PsyCap intervention procedure (Luthans et al., 2006, 2007b, 2008b, 2010). The first step is to set the target that will be used throughout the intervention process. Different people may have different goals under different contexts. For instance, a target for a commercial manager can hardly be accepted by a production worker. Therefore, the target must be familiar and relevant to the specific treatment group. Secondly, the existing publications reported they utilised the same intervention method in terms of intervening steps rather than unified training materials. Given their use of different samples in different contexts, it can be assumed that their training materials were customised, which attracted their participants. Thirdly, according to the suggestion by Kristensen (2005), only when the intervention research and core tasks of the workplaces can be combined and integrated, can commitment be sustained in any experimental research.

The discussion of goal setting examples involved several line managers and supervisors. At first, around ten possible interesting targets were compiled in a list via brain storming among the group. Two interesting targets were selected after further discussion. I double-checked these two target examples with a broader range of supervisors and line managers, and received positive feedback to use them for PCI training. These two examples are:

- a) Goal setting Example A: to improve production efficiency by 5% in one-year period
- b) Goal setting Example B: to save money (RMB 50,000) over a three-year period, then return to one's hometown to establish a small business

These two examples suggested by the three organisations are most relevant to the work and life of production workers labouring under the current manufacturing crisis. The PCI training followed the standard procedures suggested by PsyCap intervention studies (e.g. Luthans et al., 2006, 2007b, 2008b, 2010), starting from the clarification with the target setting and how to prepare resources to achieve those goals (discussed in Chapter 3). This study was able to conduct face-to-face PCI training to facilitate the PsyCap intervention.

The details of the PCI training were described as follows:

Prior to the PCI training, I reviewed the target statement with trainees to ensure that each of them understood the target. I also guided them in setting up sub goals by calculating additional production volume on monthly, weekly and daily basis in order to accomplish the target. As described, this work-related target was set by supervisors and line managers, with clear beginning and ending points. Therefore it is ensured that the target is personally valuable and reasonably challenging. I then divided the trainees into small groups, with group size from five to eight.

First, the PCI training started from the identification of the factors that affect the accomplishment of the target. Typical answers were quality of the finished products, workers' operational speed, number of production workers, material, well-designed machine, production workers' cooperation, and work conditions. Second, they discussed solutions to ensure the

readiness of the above determining factors. Third, they listed potential obstacles that might have negative impacts on the accomplishment of the target, mainly including power failure, machine breakdown, shortage of material, and high employee turnover rate. Fourth, they discussed options to overcome obstacles from two aspects, proactive solutions to prevent obstacles (proactive approach), as well as options to overcome obstacles once they occur (remedial approach). Fifth, they discussed risks and the worst situation where their progress could be impeded in the accomplishment of the goal. Typical answer is production safety and health. Sixth, similar to the obstacle planning exercise, they discussed options to prevent or resolve the risks and the worst situation from two aspects, proactive approach and remedial approach. Sixth, they created a list of necessary resources that could assist in accomplishing the goal. Typical feedback includes skills, proficiency of their job, and connections with employees in non-production department (e.g. human resource department, warehouse, logistic department). They further categorized the resources into two groups: available and not yet available. They were encouraged to identify in advance the ways to expand and sustain the resources. Seventh, trainees share successful experience and stories about how goals were obtained in the group. Eighth, each group received feedback from the other group regarding additional obstacles, pathways, and resources that should be considered. Ninth, voluntarily, one of the trainees presented successful experience or stories about how he or she contributed to the improvement of productivity. Tenth, at the end, this process generated a list of organizational support (e.g. reduction of employee turnover rate; safety and health; skills and proficiency training for new production workers) required in the accomplishment of the task.

PCI training was scheduled sequentially among the three companies, because I physically conducted the PCI training for supervisors. Regardless of different schedules and locations, PCI

training used the same processes and the same material throughout the three companies. The training lasted four hours, with two two-hour consecutive sections conducted in each of the three companies.

5.6.4 Follow-up observation after PCI training

To observe the behaviour changes of supervisors who participated in PCI training (treatment group), I provided them with take-home exercises that are open questions to which they could write down any feedback after the training. I went to production areas weekly to check and observe their exercise records randomly. The intention of the observation is to get some idea as to whether there is any observable difference between the treatment and control groups. Indeed, over time my observation and the exercise records indicate that supervisors in the treatment group become different from those of the control group. Supervisors in the treatment group are generally more emotionally pleasant, confident, helpful, and have more interactions with their production workers under their supervision than do supervisors in the control group.

5.6.5 Second - round survey administration

The second-round survey was arranged in the weeks of 9 to 10, which was six weeks after the PCI training in the weeks 3 to 4. Survey administration followed the same procedures and used the same questionnaires as in the first-round survey. Consistency and systematic procedures across the two time points can reduce the risk of any random measurement error (Spector and Brannick, 1995).

Again, the distribution of the questionnaires in the second round survey must be scheduled sequentially among the three companies. Only production workers participating in the first-

round survey received questionnaires, but it was their choice whether to complete the questionnaire and hand it in once they had finished the second-round survey.

According to the observation, most of the production workers completed their questionnaires within 20 minutes. For the supervisor and line managers, the completion time still varied but overall, it was shorter than in the first-round survey. There were a total of 957 production workers (1,011 in the first-round survey) in these three companies, but only 682 out of 805 production workers satisfied the criteria of a three-month tenure. There were 123 production workers (805 minus 682) who had worked more than 3 months for the companies (before March 1, 2010) but who had left, again indicating a high work turnover that echoes the negative impacts prevailing in China's manufacturing sector at the time (discussed in Section 5.2).

5.7 Samples

Response rates and valid sample sizes for individuals at each stage are presented in Table 5–9. In the first-round survey, 793 of the total 805 questionnaires were returned, and 774 questionnaires were immediately usable without any missing information. This represented a response rate of 96% (774/805) in the first-round survey, which is highly satisfactory. In the second-round survey, 650 of the total 682 questionnaires were returned, and 630 questionnaires were immediately usable. This represented a response rate of 92% (630/682) in the second-round survey, also highly satisfactory. There were 19 nonusable questionnaires in the first-round survey, also highly satisfactory. There were 19 nonusable questionnaires in the first-round survey, and 20 nonusable questionnaires in the second-round survey either had omissions or certain items had been chosen twice; thus, it was considered better for the study's validity to exclude them from the analysis.

As discussed in Section 5.6, predictor variables were rated by production workers, and criterion variables were rated by their supervisors. This study used listwise deletion to deal with missing data. Only when the measures of all variables (e.g. reports from production workers, supervisors, and line managers) were all available, did the data case remain. Measurement of criterion variables was well-rated by supervisors without any missing data in both the first- and second-round surveys. Data screening discovered that supervisors missed 10 production workers' assessments (rating on work competence and OCB) in the 2nd round survey, and these 10 data cases were removed from the data set.

The final sample size is 620 at individual level, resulting in a response rate of 77% (620/805) after two survey rounds. According to benchmark response rate (50%) in the review paper by Baruch and Holtom, (2008), the response rate in this study is regarded highly favourably. These questionnaires were included in the data analysis, with individual level samples presented in Table 5–11.

Table 5–11: Returned questionnaires and response rate across two survey rounds, individual level

	Total production workers	Target production workers	Returned questionnaires	Useable questionnaires	Response rate
First round	1,011	805	793	774	96%
Second round	957	682	650	630	92%
Difference between first and second rounds	54	123	143	154	

Team level criterion variables were rated by line managers. As discussed in Section 5.6, only teams with three or more respondents at both the first and second rounds were target teams in the study. There were a total of 104 teams in the first-round survey and 101 teams in the

second-round survey. The numbers of target teams decreased from 98 in the first round to 88 in the second round. In the first-round survey, 89 of the total 98 questionnaires were returned. All returned questionnaires were immediately usable without any missing information, representing a response rate of 91% (89/98) in the first-round survey, a highly satisfactory rate. In the second-round survey, 87 of the total 88 questionnaires had been returned, with all returned questionnaires immediately usable. This represented a response rate of 99% (87/88) in the second-round survey, which is extremely satisfactory.

The final sample size is 87 at team level, with the team size ranging from 3 to 21, representing a response rate of 89% (87/98) after the second-round survey. The response rate at team level is highly favourably. These questionnaires were included in the data analysis. Response rate and valid sample size for teams are presented at each stage in Table 5–12.

Table 5–12: Returned questionnaires and response rate across two survey rounds, team level

	Total teams	Target teams (team size ≥ 3)	Returned questionnaires	Useable questionnaires	Response rate
First round	104	98	89	89	91%
Second round	101	88	87	87	99%
Difference between first and second rounds	3	2	2	2	

For analysis purposes, the participant samples can be categorized into two groups (Table 5–13):

Participants whose supervisors attended the PCI training are the treatment group, and participants whose supervisors did not attend the PCI training are the control group, the treatment group consists of 39 teams, including 300 valid samples, and the rest, 48 teams, are the control group, with 320 valid samples.

Table 5–13: Categorizing returned questionnaires into PCI and NPCI group

	Supervisors in treatment group	Direct reports under treatment group	Supervisors in control group	Direct reports under control group
First round	40	342	49	432
Second round	39	300	48	320
Difference between first and second rounds	1	42	1	112

5.8 Descriptive statistics

Two-tailed data analyses were conducted using SPSS 19 for Windows for descriptive analysis.

5.8.1 Individual level

As discussed in Section 5.7, the final sample size across the two survey rounds is 620 at individual level. The researcher used listwise deletion to deal with missing data; as a result, all data are immediately available for analysis at both individual and team levels.

There are 300 valid samples in the treatment group (PCI) and 320 in the control group (NPCI) (see Table 5–14). Characteristics of the final 620 samples include: respondents reported 362 females (58%) and 248 (42%) males. Of the respondents, 361 (58%) were married. Average age is 28 years with a standard deviation of 6, ranging from 18 to 59 years. The average tenure with the current company is 1.7 years ($SD=1.3$), ranging from 0.3 to 6.9 years. In terms of educational attainment, 70% (431) had received junior middle school certification, and 30% (189) had received higher than high middle school certification.

Table 5–14: Sample size across two survey rounds, individual level

	Sample size @Time1	Percent @Time1	Sample size @Time2	Percent @Time2
PCI	342	44%	300	48%
NPCI	432	56%	320	52%
Total	774	100%	620	100%

5.8.2 Team level

As discussed in Section 5.7, the final sample size across two survey rounds is 87 at the team level. Of the 87 teams, 39 (45%) are the treatment group (PCI group), and the remainder of the teams, 48 (55%), are the control group (NPCI group) (see Table 5–15). The average tenure of the team is 1.7 ($SD = .95$) years ranging from .3 year to 4.3 years.

Table 5–15: Sample size across two survey rounds, team level

	Sample size @Time1	Percent @Time1	Sample size @Time2	Percent @Time2
PCI	40	45%	39	45%
NPCI	49	55%	48	55%
Total	89	100%	87	100%

5.9 Procedural techniques

Common method bias is a measurement error that refers to the possibility of artificial increase in the values of coefficients, leading to the conclusion that some relationships exist when in fact they do not. According to a meta-analysis by Crampton and Wagner (1994), the inflation of co-variation measures with the use of self-reported data is related to common method bias. Donaldson and Grant-Vallone (2002) also suggest that self-reporting cause many kinds of response bias, which in turn may inflate inferences about causality. According to a review by Podsakoff et al., (2003), commonality, in terms of self-rating, measurement context, item context, and item characteristics, accounts for potential sources of common method biases. They suggest two primary methods to control for common method bias: procedural remedies and statistic controls. The procedural remedies used in this study include five techniques: multiple data sources, evaluation apprehension, counterbalance question order, improving scale items, and beating the benchmark for a good longitudinal research (see Table 5–16).

Table 5–16: Summary of five procedure techniques used in this study

	Techniques	Activities involved in each technique
A	Multiple data sources	Ratings from production workers, supervisors, and line managers
B	Evaluation apprehension	Keep high confidentiality (e.g. coding; research ethic) No right, no wrong
C	Counterbalance question order	Semantic differential for measuring predictor and criterion variables
D	Improving scale items	Removing ambiguous and unfamiliar contextual items
E	Beating the benchmark for good methodological quality of longitudinal research	Measure independent variables on Time 1 and dependent variables on Time 2 (complete panel design) Use 1 time lag, good reference and SEM. Check the response on Time 1 and Time 2

5.9.1 Technique A: multiple data sources

Social desirability is one of the potential problems that can cause common method bias in self-reporting measures (Donaldson and Grant-Vallone, 2002; Podsakoff et al., 2003; Spector, 1987; 1994). Social desirability is the tendency for a respondent to choose a socially desirable answer, regardless of his or her actual thoughts and beliefs (Donaldson and Grant-Vallone, 2002; Nunnally, 1978; Spector, 1987). For instance, respondents are likely to rate themselves in a way that makes them appear favourable to others. Respondents also tend to either under-report or over-report behaviours of others (e.g. supervisor, line managers, and peers) when answering sensitive questions. Therefore, one consideration in this study design was social desirability

bias, which can result when all variable measurements are taken from participants' self-reporting.

According to Podsakoff et al., (2003), obtaining measures of the predictor and criterion variables from different sources (Technique A) is the best way to control common method bias raised by social desirability. They also advise that the optional remedy of separating the measurement of the predictor and criterion variables when obtaining data from multiple sources is not possible. This study used a multiple data source technique by measuring leadership behaviour (e.g. authentic leadership, role modelling) from the production workers, and measuring production workers' work competence and OCB from the leaders, resulting in two data sources at individual level. At the team level, an additional data source is obtained by measuring team-level work competence and OCB from the line managers, resulting in three data sources at the team level: aggregated ratings of production workers, line manager ratings, and aggregated ratings of supervisors. This research design aspect reduces the issue of social desirability bias in the data.

5.9.2 Technique B: reducing evaluation apprehension

The study by Spector and Brannick (1995) suggests that social desirability is also an important source of common method bias when answering sensitive questions. Respondents may fear their answers will be exposed to their employers, which could get them into trouble. Podsakoff et al., (2003) reports that not only can nonself-rated reports be employed, but to protect respondent anonymity and reduce evaluation apprehension, Technique B can also be used to control for social desirability risk.

Making a response anonymous was impossible in this study, but evaluation apprehension was controlled for in the following ways: Firstly, as discussed in Section 5.6.1, respondents were encouraged to complete the questionnaires as honestly as possible, because they were told there were no right or wrong answers; and secondly, this study used a code instead of an employee's name throughout the survey; therefore, employee anonymity is protected. Moreover, a confidentiality agreement (see Section 5.3) was signed between each of the three companies and the researcher. The company promised to not request any individual employees' reported information, and I am not allowed to use the personnel and survey information for nonresearch purposes. These efforts can help allay fears that answers will be exposed to others and encourage respondents to answer questionnaires according to what they really think rather than choosing the socially desirable response, which is predicted to reduce evaluation apprehension bias in the data.

5.9.3 Technique C: counterbalance question order

According to Podsakoff et al., (2003), another remedy is to counterbalance the measurement order of the predictor and criterion variables (Technique C). There are five variables in the study, including authentic leadership, role modelling, PsyCap, work competence, and OCB. Measuring predictor variables of authentic leadership, role modelling, and PsyCap were collected from production workers, and measuring criterion variables were collected from supervisors. It is expected that authentic leadership will have impacts on workers' PsyCap through role modelling. Therefore, authentic leadership and role modelling are predictor variables, and PsyCap is a criterion variable among the three variables rated by production workers' self-reporting. In the production workers questionnaire, the format of measurement was separated into two parts, starting with rating production workers' PsyCap as the first part, followed by rating leaders' behaviour (e.g. authentic leadership and role modelling) as the

second part. The purpose of the format separation is to build a semantic differential for the measuring predictor and criterion variables. It appears there was no connection between measuring the predictor variable and that of the criterion.

5.9.4 Technique D: improving scale items

Improving scale items is another remedy to reduce the effect of common method bias (Podsakoff et al., 2003). The pilot survey provides opportunities for me to improve scale items. Some items of the measurement construct of role modelling and OCB were eliminated, based on feedback from the pilot survey (discussed in Section 5.5.2). The eliminated item that measured role modelling seems to hold the same meaning as the remaining item. The three items describing protecting company resources were not familiar to production workers in China. Improving scale items thus reduces comprehension bias in the data.

5.9.5 Technique E: beating the benchmark for good methodological quality of longitudinal research

Researchers (e.g. Nesselroade and Baltes, 1979; Taris 2000; Zapf, Dormann, and Frese, 1996) have provided benchmark (See Table 5–17) to assess the quality of longitudinal studies. They suggested using five criteria to evaluate the methodological quality of a longitudinal study. These five criteria are displayed in Table 7-1. The first criterion refers to one or more time lags, which measures data in two rounds or above. The second criterion is using measurement constructs of good reliability and validity. The third criterion is related to the method of analysis, using SEM or multiple regressions are preferred. This is consistent with suggestions by other researchers (e.g. Anderson and Gerbing 1988; Kline, 2005; Podsakoff et al., 2003) that SEM is a powerful analytical tool to test cause-effect path. The fourth criterion refers to nonresponse analysis as the result reveals a possibility of response bias. The fifth criterion is the design of longitudinal research, with complete panel design is preferred. They noted that a good longitudinal study must incorporate a complete panel design. Complete panel design measures independent variable on Time 1 and dependent variables on Time 2 and check whether the effect of Time 1 demands on Time 2, while incomplete panel design collect data in two waves but at least one variable was not measured on some occasions (Zapf et al., 1996). The merits of complete panel design versus incomplete lies in the fact that firstly, all variables are measured at least once along with independent variable on Time 1 and dependent variables on Time 2; therefore, data are available in the examination of normal, reverse, and reciprocal causality (Taris and Kompier, 2003; Zapf et al., 1996). But incomplete panel design restricts the examination of reverse and reciprocal causality, which can lead to premature or incorrect judgement of the causal- effect path. Secondly, complete panel design provides the opportunity to assess synchronous effects of the studied variables, as full data are available on all occasions.

Accordingly, complete panel design is preferred over incomplete panel design, due to its higher quality of output (De Lange, Taris, Kompier, Houtman, and Bongers, 2003; Menard 2000; Taris 2000; Zapf et al., 1996).

Table 5–17: Benchmark for a good methodological quality of longitudinal study

criteria	Preferred
Design	Variables measured on two rounds or above (complete panel design)
Time lags	one time lag or above
Measures	Good reference and psychometric checks on data
Method of analysis	SEM or multiple regression
Nonresponse analysis	Check response on Time 1 and Time 2

Sourced by De Lange et al., (2003, p. 286)

This study meets all the above criteria. Specifically, this study measured all studied variables in two rounds, tested a time lagged effect, i.e. authentic leadership on Time 1 demands role modelling on Time 2. This study also provide explanation that the reason to examine the time lagged effects is because the effect of authentic leadership on role modelling develops over time and the influence can hardly be detected if data is collected at the same time points (discussed in Chapter 4). This study selected well-established measurement constructs from publications, and statistical analysis find excellent reliability and validity, which justifies the use of all measures, are appropriate. Analysis of response reported very high on Time 1 and Time 2. This study uses SEM to check all alternative models including direct and indirect relationship. Therefore, the findings on causal models are safe.

In sum up, this study is a good methodological quality of longitudinal research on basis of an evaluation system recommended by researchers (e.g. Nesselroade and Baltes, 1979; Taris 2000; Zapf et al., 1996). The procedural techniques and statistics techniques will contribute to reduce common method bias. Inferring the cause-and-effect relationships among the variables under investigation will be safe.

5.10 Structural equation model (SEM)

In addition to the multiple procedural remedies discussed in Section 5.8, a statistical remedy is another primary method to control for common method biases (Podsakoff et al., 2003). SEM regarded as statistical powerful, has become a popular statistical technique to test theory-driven hypotheses, causal paths, and mediations (Anderson and Gerbing, 1988; Bollen, 1989; 2002; Byrne 2012; Kline, 2005; Podsakoff et al., 2003). In particular, researchers (e.g. MacKinnon, Lockwood, Hoffman, et al., 2002) highly recommended SEM when testing mediations.

SEM is used in this study for several reasons: this study has addressed causal hypotheses based on theories (discussed in Chapter 4), which requires the data analysis takes a confirmatory rather than exploratory approach. SEM can specify regression structures among the studied variables by testing the impact of one variable on another. Without the specification of the pattern of inter-variable relations, testing causal hypotheses is difficult. Second, SEM allows the estimation of errors by testing alternative models and it is regarded as the best method to test Type I errors (MacKinnon, Lockwood, Hoffman, et al., 2002). Alternative models propose several competing models, whereas the baseline model constitutes the causal hypotheses. By comparing between alternative models and the baseline model, it can be checked out whether

there is a model better describes the sample data. Third, using SEM procedures incorporate both direct and indirect relationships simultaneous, mediation testing can be easily applied as it is recommended by MacKinnon, Lockwood, Hoffman, et al., (2002).

5.10.1 Mediation test

In testing for mediation, according to Baron and Kenny's (1986) technique, as developed by Kenny, Kashy, and Bolger (1998), the following four conditions need to be satisfied: 1) The independent variable has a significant effect on the dependent variable, 2) the independent variable has a significant effect on the potential mediator, 3) the potential mediator has a significant effect on the dependent variable, and 4) the relationship of the independent variable toward the dependent variable is significantly lower in the magnitude while controlling the potential mediator.

It is argued whether the first condition in mediation testing proposed by Baron and Kenny (1986) is necessary or not. On the one hand, some researchers suggested that performing the Baron and Kenny (1986) approach as regards the direct effect from the predictor to outcome (the first condition) is a requirement in testing for mediation. The lack of a direct effect from the predictor to outcome rules out mediation. For example, Mathieu and Taylor (2006, p. 1038) argued that: 'If no such relationship exists, then there is nothing to be mediated'. On the other hand, some researchers argued that the first condition suggested by Baron and Kenny's (1986) does not have to be met. For example, Kenny et al., (1998, p. 260) suggested that the direct effect from the predictor to outcome (the first condition suggested by Baron and Kenny (1986)) is not required and the essential steps in establishing mediation are to prove the effect from the independent variable to the potential mediator and the effect from the potential mediator to the outcome (the second and the third conditions suggested by Baron and Kenny (1986)). Seibert et

al., (2004) argue it is not necessary to know whether a significant direct relationship between the independent and dependent variables for mediation to exist, as long as there are relationships from independent variables to mediator, and from mediator to dependent variables. James et al., (2004) also pointed out the approach by Baron and Kenny (1986) is a partially mediated model, and in the fully mediated model it is not expected to observe a direct relationship between predictor and outcome. Hair, Black, Babin, Anderson, and Tatham, (2006) recommend three steps to identify a full mediator: 1) the independent variable statistically significantly affects the mediating variable, 2) the mediator statistically significantly affects the dependent variable, 3) the direct relation between the independent variable and dependent variable, appears to be statistically non-significant while controlling and adding the mediator.

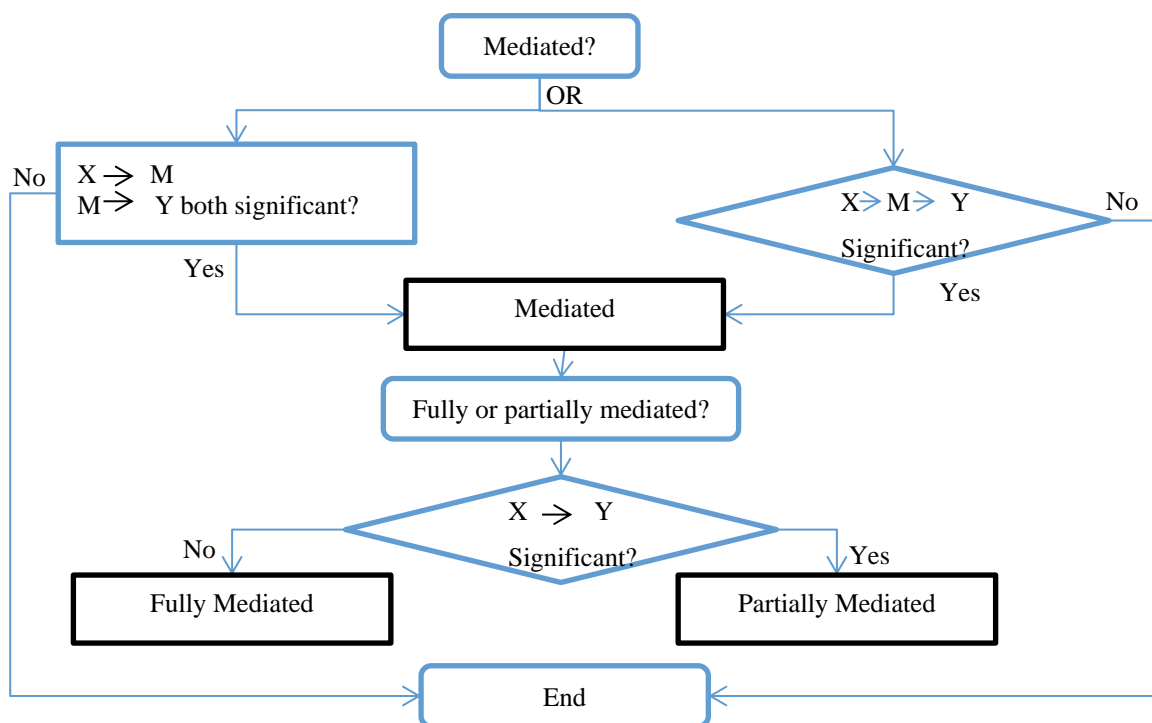
The arguments provide different aims in the assessment of mediation. Baron and Kenny (1986) approach tests a partially mediated model, with effects among the independent (X), Mediator (M), and dependent effect (Y) tested separately (independent (X)→dependent effect (Y); independent (X)→Mediator (M); Mediator (M) →dependent effect (Y)), whereas, the Hair et al., (2006) approach tests full mediation, focusing on the test of significance of the indirect effect from predictor to dependent variable via mediator (independent (X)→ Mediator (M) → dependent effect (Y)). Regardless of how these arguments between these two mediation approaches play out, there is sufficient consenses between these two approaches, which is a core evidence of mediator is the independent (X)→ Mediator (M) →dependent effect (Y) is significant. As both of these approaches are prominent in the psychological research literature (Schneider et al., 2005), this study will use the Hair et al., (2006) approach to test full mediation, and Baron and Kenny (1986) approach to test partial mediation.

A detailed process for mediation test is presented in Flow chart 5-1, which presents a summary of their research methods. The combination use of these two approaches is also supported by many researchers (E.g. Mathieu and Taylor, 2006).

From the above discussion, this study will use a sequence of steps to test mediation:

The first step is to test the effects from the predictor (X) to Mediator (M), from the Mediator (M) to dependent effect (Y), and from the predictor to dependent variable via mediator (independent $(X) \rightarrow \text{Mediator (M)} \rightarrow \text{dependent effect (Y)}$). When the evidence is clear that statistically significant direct paths $(X \rightarrow M, M \rightarrow Y)$, and indirect path $(X \rightarrow M \rightarrow Y)$ exists simultaneously, it can be concluded that the model is mediated. The second step is to identify whether the mediation is full or partial by testing the direct part from independent to dependent $(X \rightarrow Y)$. A significant path indicates a partial mediation, and non-significant as full mediation. Using SEM is in advantage because it allows testing the direct and indirect paths simultaneously.

Flow chart 5–1: Guidelines on processing mediation test



5.10.2 Guidance for SEM

It is suggested that the typical SEM model consists of a measurement model and a structural model (Anderson and Gerbing, 1988; Bollen, 1989; 2002). Measurement model presents the links between the latent variables and the measures, whereas structural model indicates the links among the latent variables themselves. CFA is a sophisticated statistical technique used to test measurement model. CFA examines whether the number of variables and the relationships among them are fixed or unrotated (Podsakoff et al., 2003). The result of CFA indicates how well the measurement model fits the data. A good fit of the measurement model confirms content validity, indicating that variables measure the underlying factors well. This study follows a two-step approach suggested by Anderson and Gerbing (1988) to test causal hypotheses. The first step begins with CFA to determine the goodness-of-fit of the measurement model. The second step follows by assessing the goodness-of-fit of the structural model. This study used both CFA and SEM at both individual and team levels.

A three-step framework proposed by Jöreskog (1993) is widely used as guidance for testing SEM (Byrne 2012). According to Jöreskog (1993), to find a model which best describes the sample data, three sequential steps are recommended: First, postulate a single model based on the theory, which forms the baseline model. Next, test and evaluate the fit of the baseline model (See Section 5.9.3). Decision is made to either reject or fail to reject on basis of the result. Reject demands model modification and failing to reject leads to the second step. Second, propose alternative models, test and find whether there is a better model (See Section 5.9.4). Third, compare the alternative model with the baseline model then generate the best model in representing the sample data. By running these steps, a conclusion can be made that the best

model is both substantively meaningful and statistically well fitting. This study strictly followed this three-step framework in both CFA (See Section 5.9.3, 5.9.4) and SEM testing (Chapter 6). *Mplus* v.5.2 (Muthén and Muthén, 1998–2007) is used to test CFA and SEM. Input files for *Mplus* was built by using SPSS 19 to input data which were converted for using *Mplus*.

5.10.3 Evaluating the fit of structural equation models

The evaluation of model fit should consider various measures simultaneously (e.g. Browne and Cudeck 1993; Hu and Bentler, 1995;1998;1999; Steiger 1990). This study used Chi-square (χ^2) tests of model fit in conjunction with several indices of model fit, including degrees of freedom (*df*), the Comparative-Fit-Index (CFI), TuckerLewis index (TLI), Root Mean Square Error Of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR), because these goodness-of-fit indices are regarded as appropriate to judge whether the model is consistent with the sample data (Bentler, 1990; Browne and Cudeck 1993; Hu and Bentler, 1995;1998;1999).

Among these indices, only χ^2 test has an associated significance test, while all the rest are descriptive. It is suggested that there is no unified standard for what minimal conditions constitute an adequate model fit (Schermelleh-Engel, Moosbrugger, and Müller 2003), but there are some rules of thumb criteria recommended by researchers (e.g. Browne and Cudeck's 1993; Hu and Bentler, 1998,1999). Table 5–18 presents their recommendations for model evaluation. For a good model fit, the *p*-value associated with the χ^2 value should be as large as possible and the ratio χ^2/df should be as small as possible. The ratio χ^2/df between 0 and 2, 2 and 3 is indicative of a “close” or “adequate” data-model fit, respectively (Bollen, 1989, p. 278). CFI and TLI are goodness of fit measures with values between 0 and 1 and higher values indicates good fit. CFI and TLI values greater than .97 indicates a close fit, values between .95 and .97

as adequate fit, values between .91 and .95 as acceptable fit (Hu and Bentler, 1995, 1998,1999). CFI and TLI is not sample sensitive (Bentler, 1990; Bollen, 1990; Hu and Bentler, 1995, 1998, 1999), whereas RMSEA is very sensitive to sample size because it measures discrepancy per degree of freedom (Browne and Cudeck 1993, p.144). RMSEA value of less than .05 indicates close-fit, values between .05 and .08 as an adequate fit, and values between .08 and .10 as a mediocre fit (Browne and Cudeck 1993; Steiger 1990). *SRMR* is calculated based on the fitted residuals; therefore, it should be as small as possible. *SRMR* value of less than .05 indicates a close fit and value less than .10 as adequate or acceptable fit (Hu and Bentler, 1995).

Table 5–18: Summary of ‘rules of thumb’ criteria for model evaluation

Fit Measure	Close Fit	Adequate Fit	Acceptable
χ^2	$0 \leq \chi^2 \leq 2df$	$2df < \chi^2 \leq 3df$	
p value	$.05 < p \leq 1.00$	$.01 \leq p \leq .05$	
χ^2/df	$0 \leq \chi^2/df \leq 2$	$2 < \chi^2/df \leq 3$	
CFI	$.97 \leq CFI \leq 1.00$	$.95 \leq CFI < .97$	$.91 \leq CFI < .95$
TLI	$.95 \leq CFI \leq 1.00$	$.95 \leq CFI < .91$	$.91 \leq CFI < .95$
RMSEA	$0 \leq RMSEA \leq .05$	$.05 < RMSEA \leq .08$	
SRMR	$0 \leq SRMR \leq .05$	$.05 < SRMR \leq .10$	

5.10.4 Comparing Structural Equation Models

The purpose of evaluating the fit of structural equation models is to judge whether a single model describe the sample data. When comparing two or more models, a Chi-square difference ($\Delta\chi^2$) tests is provided by researchers (e.g. Bentler, 1990; Bollen, 1989; Jöreskog, 1993). To computer a Chi-square difference tests, the difference of the χ^2 values of the two models as well as the difference of the degrees of freedom df is taken.

$$\Delta\chi^2 = \chi_S^2 - \chi_L^2 \quad \Delta df^2 = df_S^2 - df_L^2$$

Researchers (e.g. Bentler, 1990; Bollen, 1989; Jöreskog, 1993) provided detail guidance for two structural equation models comparison (See Table 5–19): S denotes the “Smaller” model with less free parameters and more degrees of freedom, whereas L denotes the “Larger” model with more free parameters and less degrees of freedom. If the Chi-square difference $\Delta\chi^2$ is significant, the “Larger” model fits the data better than the “smaller” model. In case the Chi-square difference $\Delta\chi^2$ is not significant, the “Smaller” model fits the data better than the “Larger” model.

Table 5–19: Summary of significance test comparing two structural equation models

Chi-Square Difference Tests	Better Model
significant	Larger model with less <i>df</i>
Non-significant	Smaller model with more <i>df</i>

This study used an auto online calculator

<http://www.stat.tamu.edu/~west/applets/chisqdemo.html> to computer the Chi-Square difference tests when comparing alternative nested models against the baseline model in SEM testing (Chapter 6).

5.11 Confirmatory Factor Analysis (CFA)

The measurement models were evaluated using CFA. The aim of CFA testing is to evaluate the model fit between the latent variables and the measures. This step must be tested separately from the structural models according to the suggestion by Anderson and Gerbing (1988) and Jöreskog 1993 as discussed in Section 5.9.

5.11.1 Individual level

This study starts the four-factor CFA. From the correlation matrix in Table 5–13, it is indicated that AL is related with XRM only; this study then adds the AL variable as a predictor of XRM in the model. CFAs were undertaken to determine appropriate measurement models. Mplus v.5.2 (Muthén and Muthén, 1998–2007) was constructed to test the four-factor model, with the five-factor model test following.

5.11.1.1 Four-factor CFA (XRM-XPsy-XCP-XOCB)

Analyses demonstrated a close model fit, with four-factor analysis ($\chi^2 = 177.38$; $df = 84$; CFI = .97; TLI = .96; RMSEA = .04; SRMR = .04).

There were 11 alternative models tested: *Models 1-6*, three-factor models with two factors merged into each model. For example, Model 1, XRM, and XPSY combined into a single factor; Model 2, XPSY, and XCP combined into a single factor; *Models 7-10*, two-factor models with three factors merged into each model. For example, Model 7, XRM, XPSY, and XCP combined into a single factor; *Models 11*, a one-factor model with all four factors merged into a single factor. Table 5–16 details the fit indices statistics for the alternative models. All competing models were significantly worse than the baseline measurement model. Therefore, the four-factor measurement model will be used for structural equation modelling of the latent variables to test Hypotheses (see Chapter 6).

(Insert Table 5–20: Four-factor CFA, individual level)

5.11.1.2 Five-factor CFA (AL-XRM-XPsy-XCP-XOCB)

Analyses demonstrated a good model fit, with five-factor analysis

($\chi^2=229.30$;df=142;CFI=.98;TLI=.97;RMSEA=.03;SRMR=.03).

There were 26 alternative models tested: Models 1–10, four-factor models with two factors merged in each model. For example, Model 1, AL, and XRM combined into a single factor; Model 2, AL, and XPSY combined into a single factor; Models 11–18, three-factor models with three factors merged in each model. For example, Model 11, AL, XRM, and XPSY combined into a single factor; Models 19–21, two-factor models with four factors merged in each model. For example, Model 20, AL, XPSY, XCP, and XOCB combined into a single factor, leading to the examination of two factors, including the combined factor and XRM.

Table 5–17 details the fit indices statistics for the alternative models. The results indicate some alternative models (e.g. Models 22–29) could not be computed, due to convergence. For example, Model 22, a three-factor model with AL, XPSY, and XCP merged, but the result indicates it is not an appropriate model. Model 29 is a one-factor model with all five factors merged into a single factor. The rest of the competing models were significantly worse than the baseline measurement model. Therefore, the five-factor measurement model will be used for structural equation modelling of the latent variables to test Hypothesis (see Chapter 6).

(Insert Table 5–21: Five-factor CFA, individual level)

In sum up, the measurement models were evaluated by comparing the baseline model and alternative models. Results from CFA indicate good model fits in both four-factor measurement

model and five-factor measurement model. Therefore, the baseline models fail to reject. This result provides possibilities for analysing structural relations in SEM (See Chapter 6).

Table 5–20: Four-Factor CFA, individual level

Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR	Dc	Ddf	p, Sig.
Baseline Model	4 factors:XRM-XPSY-XCP-XOCB	177.378	84	0.969	0.961	0.042	0.925	0.036			
Model 1	3 factors:(XRM-XPSY)-XCP-XOCB	545.573	87	0.847	0.816	0.092	0	0.079	368.195	3	0
Model 2	3 factors:XRM-(XPSY-XCP)-XOCB	576.007	87	0.837	0.803	0.095	0	0.085	398.629	3	0
Model 3	3 factors:XRM-XPSY-(XCP-XOCB)	228.691	87	0.953	0.943	0.051	0.387	0.04	51.313	3	0
Model 4	3 factors:XPSY-XCP-(XOCB-XRM)	771.06	87	0.772	0.725	0.113	0	0.127	593.682	3	0
Model 5	3 factors:(XRM-XCP)-XPSY-XOCB	924.222	87	0.721	0.663	0.125	0	0.113	746.844	3	0
Model 6	3 factors:XRM-(XPSY-XOCB)-XCP	557.216	87	0.843	0.811	0.093	0	0.078	379.838	3	0
Model 7	2 factors:(XRM-XPSY-XCP)-XOCB	1243.683	89	0.615	0.546	0.145	0	0.123	1066.31	5	0
Model 8	2 factors:XRM-(XPSY-XCP-XOCB)	632.682	89	0.819	0.786	0.099	0	0.088	455.304	5	0
Model 9	2 factors:XPSY-(XCP-XOCB-XRM)	978.464	89	0.704	0.605	0.127	0	0.115	801.086	5	0
Model 10	2 factors:XCP-(XPSY-XOCB-XRM)	1069.776	89	0.673	0.614	0.133	0	0.12	892.398	5	0
Model 11	1 factor: (XRM-XPSY-XCP-XOCB)	1303.91	90	0.595	0.528	0.147	0	0.126	1126.53	6	0

Table 5–21: Five-factor CFA, individual level

Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR	Dc	Ddf	p, Sig.
Baseline											
Model	5 factors:AL-XRM-XPSY-XCP-XOCB	229.295	142	0.976	0.971	0.031	1	0.034			
Model 1	4 factors:(AL-XRM)-XPSY-XCP-XOCB	694.933	146	0.848	0.822	0.078	0	0.072	465.638	4	0
Model 2	4 factors:(AL-XPSY)-XCP-XOCB-XRM	842.032	146	0.808	0.775	0.088	0	0.089	612.737	4	0
Model 3	4 factors:(AL-XCP)-XPSY-XOCB-XRM	1419.836	146	0.648	0.588	0.119	0	0.143	1190.54	4	0
Model 4	4 factors:(AL-XOCB)-XPSY-XCP-XRM	277.584	142	0.963	0.955	0.039	0.996	0.035	48.289	4	0
Model 5	4 factors:AL-(XRM-XPSY)-XCP-XOCB	607.847	146	0.872	0.851	0.071	0	0.07	378.552	4	0
Model 6	4 factors:AL-(XRM-XCP)-XPSY-XOCB	1030.72	146	0.756	0.714	0.099	0	0.103	801.425	4	0
Model 7	4 factors:AL-(XRM-XOCB)-XPSY-XCP	823.808	146	0.813	0.781	0.087	0	0.105	594.513	4	0
Model 8	4 factors:AL-XRM-(XPSY-XCP)-XOCB	628.45	146	0.867	0.844	0.073	0	0.071	399.155	4	0
Model 9	4 factors:AL-XRM-(XPSY-XOCB)-XCP	609.613	146	0.872	0.85	0.072	0	0.065	380.318	4	0
Model 10	4 factors:AL-XRM-XPSY-(XCP-XOCB)	280.649	146	0.963	0.956	0.039	0	0.036	51.354	4	0
Model 11	3 factors:(AL-XRM-XPSY)-XCP-XOCB	1093.457	149	0.739	0.701	0.101	0	0.098	864.162	7	0
Model 12	3 factors:(AL-XRM-XCP)-XPSY-XOCB	1775.171	149	0.551	0.485	0.133	0	0.133	1545.88	7	0
Model 13	3 factors:(AL-XRM-XOCB)-XCP-XPSY	1299.106	149	0.0682	0.635	0.112	0	0.125	1069.81	7	0
Model 14	3 factors:AL-(XRM-XPSY-XCP)-XOCB	1350.041	149	0.668	0.619	0.114	0	0.11	1120.75	7	0
Model 15	3 factors:AL-(XRM-XPSY-XOCB)-XCP	1142.739	149	0.726	0.685	0.104	0	0.104	913.444	7	0
Model 16	3 factors:AL-(XRM-XCP-XOCB)-XPSY	1085.336	149	0.741	0.703	0.101	0	0.105	856.041	7	0
Model 17	3 factors:AL-XRM-(XPSY-XCP-XOCB)	685.248	149	0.852	0.83	0.076	0	0.073	455.953	7	0
Model 18	3 factors:(AL-XPSY-XOCB)-XCP-XRM	1231.73	149	0.701	0.657	0.108	0	0.108	1002.44	7	0
Model 19	2 factors: AL-(XRM-XPSY-XCP-XOCB)	1411.411	151	0.652	0.606	0.116	0	0.112	1182.12	9	0

Model 20	2 factors: XRM-(AL-XPSY-XCP-XOCB)	1316.833	152	0.678	0.638	0.111	0	0.116	1087.54	10	0
Model 21	2 factors: XCP-(AL-XPSY-XRM-XOCB)	1654.299	151	0.585	0.53	0.127	0	0.13	1425	9	0
Model 22	4 factors:(XPSY-AL)-XCP-XOCB-XRM	NA									
Model 23	4 factors:(XCP-AL)-XPSY-XOCB-XRM	NC									
Model 24	4 factors:(XOCB-AL)-XPSY-XCP-XRM	NA									
Model 25	3 factors:(AL-XPSY-XCP)-XOCB-XRM	NA									
Model 26	3 factors:(AL-XCP-XOCB)-XPSY-XRM	NC									
Model 27	2 factors: XPSY-(AL-XRM-XCP-XOCB)	NA									
Model 28	2 factors: XOCB-(AL-XPSY-XCP-XRM)	NA									
Model 29	1 factor: (AL-XRM-XPSY-XCP-XOCB)	NA									

5.11.2 Team level

CFAs were also undertaken to determine appropriate measurement models at the team level. In the same way as for the individual level, four-factor and five-factor models were tested sequentially.

5.11.2.1 Four-factor CFA (XRM-XPsy-XLCP-XOCB)

The analyses results demonstrated a good model fit with four-factor analysis ($\chi^2 = 123.37$; $df = 84$; CFI = .95; TLI = .94; RMSEA = .08; SRMR = .10).

There were 11 alternative models tested: Models 1–6, three-factor models with two factors merged in each model. For example, Model 1, XRM, and XPSY combined into a single factor; Model 2, XPSY, and XLCP combined into a single factor; Models 7–10, two-factor models with three factors merged in each model. For example, Model 7, XRM, XPSY, and XLCP combined into a single factor; Model 11, a one-factor model with all four factors merged into a single factor. Table 5–18 details the fit indices statistics for the alternative models. All competing models are significantly worse than the baseline measurement model. Therefore, the four-factor measurement model will be used for structural equation modelling of the latent variables to test Hypotheses (Chapter 6).

(Insert Table 5–22: Four-factor CFA, team level)

5.11.2.2 Five-factor CFA (AI-XRM-XPsy-XLCP-XOCB)

The analyses results demonstrated a good model fit with five-factor analysis ($\chi^2 = 177.44$; $df = 142$; CFI = .97; TLI = .97; RMSEA = .06; SRMR = .09).

There were 26 alternative models tested: Models 1–10, four-factor models with two factors merged in each model. For example, Model 1, AL, and XRM combined into a single factor; Model 2, AL, and XPSY combined into a single factor; Models 11–20, three-factor models with three factors merged in each model. For example, Model 11, AL, XRM, and XPSY combined into a single factor; Models 21–24, two-factor models with four factors merged in each model. For example, Model 21, XRM, XPSY, XLCP, and XOCB combined into a single factor; and Model 25, a one-factor model with all five factors merged into a single factor.

Table 5–19 details the fit indices statistics for the alternative models. The results indicate one alternative model (Model 26) could not be computed, due to convergence. Three models (numbers 18, 20, 23) could not be computed at individual level but could at team level. Nevertheless, the result indicates a significantly worse result against the baseline model. The rest of the competing models are also significantly worse than the baseline measurement model. Therefore, the five-factor measurement model will be used for structural equation modelling of the latent variables to test Hypothesis (Chapter 6).

(Insert Table 5–23: Five-factor CFA, team level)

Table 5–22: Four-factor CFA, team level

Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR	Dc	Ddf	p, Sig.
Baseline											
Model	4 factors: XRM-XPSY-XLCP-XOCB	123.373	84	0.954	0.942	0.075	0.086	0.099			
Model 1	3 factors:(XRM-XPSY)-XLCP-XOCB	404.087	87	0.627	0.55	0.208	0	0.124	280.714	3	0
Model 2	3 factors:XRM-(XPSY-XLCP)-XOCB	226.724	87	0.836	0.802	0.138	0	0.164	103.351	3	0
Model 3	3 factors:XRM-XPSY-(XLCP-XOCB)	228.977	87	0.833	0.799	0.139	0	0.171	105.604	3	0
Model 4	3 factors:XPSY-XLCP-(XOCB-XRM)	260.827	87	0.796	0.754	0.154	0	0.144	137.454	3	0
Model 5	3 factors:(XRM-XLCP)-XPSY-XOCB	154.545	87	0.921	0.904	0.096	0.003	0.114	31.172	3	0
Model 6	3 factors:XRM-(XPSY-XOCB)-XLCP	255.967	87	0.801	0.76	0.152	0	0.13	132.594	3	0
Model 7	2 factors:(XRM-XPSY-XLCP)-XOCB	412.87	89	0.62	0.551	0.208	0	0.117	289.497	5	0
Model 8	2 factors:XRM-(XPSY-XLCP-XOCB)	338.871	89	0.706	0.654	0.183	0	0.166	215.498	5	0
Model 9	2 factors:XPSY-(XLCP-XOCB-XRM)	277.189	89	0.779	0.739	0.159	0	0.143	153.816	5	0
Model 10	2 factors:XLCP-(XPSY-XOCB-XRM)	484.542	89	0.535	0.452	0.23	0	0.175	361.169	5	0
Model 11	1 factor: (XRM-XPSY-XLCP-XOCB)	505.49	90	0.512	0.431	0.234	0	0.162	382.117	6	0

Table 5–23: Five-factor CFA, team level

Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR	Dc	Ddf	p, Sig.
Baseline											
Model	5 factors:AL-XRM-XPSY-XLCP-XOCB	177.444	142	0.971	0.965	0.055	0.376	0.092			
Model 1	4 factors:(AL-XRM)-XPSY-XLCP -XOCB	432.258	146	0.764	0.723	0.153	0	0.201	254.814	4	0
Model 2	4 factors:(AL-XPSY)-XLCP-XOCB-XRM	548.83	146	0.677	0.624	0.178	0	0.209	371.386	4	0
Model 3	4 factors:(AL-XLCP)-XPSY-XOCB-XRM	313.338	146	0.862	0.838	0.117	0	0.189	135.894	4	0
Model 4	4 factors:(AL-XOCB)-XPSY-XLCP-XRM	331.467	142	0.847	0.821	0.123	0.996	0.16	154.023	0	0
Model 5	4 factors:AL-(XRM-XPSY)-XLCP-XOCB	460.846	146	0.74	0.695	0.16	0	0.123	283.402	4	0
Model 6	4 factors:AL-(XRM-XLCP)-XPSY-XOCB	209.159	146	0.948	0.939	0.072	0.061	0.101	31.715	4	0
Model 7	4 factors:AL-(XRM-XOCB)-XPSY-XLCP	324.869	146	0.852	0.827	0.121	0	0.135	147.425	4	0
Model 8	4 factors:AL-XRM-(XPSY-XLCP)-XOCB	282.722	146	0.887	0.868	0.106	0	0.147	105.278	4	0
Model 9	4 factors:AL-XRM-(XPSY-XOCB)-XLCP	318.736	146	0.857	0.833	0.119	0	0.12	141.292	4	0
Model 10	4 factors:AL-XRM-XPSY-(XLCP-XOCB)	284.097	146	0.886	0.866	0.106	0	0.16	106.653	4	0
Model 11	3 factors:(AL-XRM-XPSY)-XLCP-XOCB	788.882	149	0.471	0.393	0.226	0	0.098	611.438	7	0
Model 12	3 factors:(AL-XRM-XLCP)-XPSY-XOCB	524.25	149	0.69	0.644	0.173	0	0.133	346.806	7	0
Model 13	3 factors:(AL-XRM-XOCB)-XLCP-XPSY	584.378	149	0.64	0.587	0.187	0	0.125	406.934	7	0
Model 14	3 factors:AL-(XRM-XPSY-XLCP)-XOCB	470.999	149	0.734	0.695	0.16	0	0.11	293.555	7	0
Model 15	3 factors:AL-(XRM-XPSY-XOCB)-XLCP	553.877	149	0.666	0.616	0.18	0	0.104	376.433	7	0
Model 16	3 factors:AL-(XRM-XLCP-XOCB)-XPSY	341.571	149	0.841	0.817	0.124	0	0.105	164.127	7	0
Model 17	3 factors:AL-XRM-(XPSY-XLCP-XOCB)	401.667	149	0.791	0.76	0.142	0	0.073	224.223	7	0
Model 18	3 factors:(AL-XPSY-XLCP)-XOCB-XRM	657.202	149	0.58	0.518	0.202	0	0.252	479.758	7	0
Model 19	3 factors:(AL-XPSY-XOCB)-XLCP-XRM	687.575	149	0.555	0.489	0.207	0	0.236	510.131	7	0
Model 20	3 factors:(AL-XLCP-XOCB)-XPSY-XRM	451.282	149	0.75	0.713	0.155	0	0.22	273.838	7	0
Model 21	2 factors: AL-(XRM-XPSY-XLCP-XOCB)	579.489	151	0.646	0.599	0.184	0	0.169	402.045	9	0
Model 22	2 factors: XRM-(AL-XPSY-XLCP-XOCB)	790.611	151	0.492	0.402	0.225	0	0.267	613.167	9	0
Model 23	2 factors: XPSY-(AL-XRM-XLCP-XOCB)	653.436	151	0.585	0.53	0.199	0	0.258	475.992	9	0

Model 24	2 factors: XLCP-(AL-XPSY-XRM-XOCB)	939.964	151	0.348	0.262	0.249	0	0.282	762.52	9	0
Model 25	1 factor: (AL-XRM-XPSY-XLCP-XOCB)	986.326	152	0.311	0.225	0.256	0	0.286	808.882	10	0
Model 26	2 factors: XOCB-(AL-XPSY-XLCP-XRM)	NA									

5.12 Conclusion

This chapter discussed methodology employed by the study, including research philosophy, background of the three Chinese manufacturing companies, the usage of incentive schemes to increase response rate, measures, aggregation, survey and PCI procedure and schedule, samples, descriptive statistics, and RCT to test causal hypotheses. This study uses several procedural techniques (e.g. incentive, protecting respondents' identification, blinding the treatment group) in order to increase response rate and reduce the risk of common method bias. This study employs well-established and validated scales to measure variables, back-translation, pilot surveys, and modifications with removal of some items. This chapter noted the use of competence and OCB that are rated by supervisors, rather than production worker's self-ratings. In addition, team level competence and OCB is rated by line managers. This chapter noted that different data source helps to control for common method bias. This chapter justified the aggregation of individual-level measures to the team level. This chapter explained the details (e.g. objectives, steps) of PCI training, and notes that PCI training lasting four hours and was delivered face to face. This chapter outlined the use of statistical techniques-SEM and CFA, giving reasons for its adoption how it is used and what it tests. This chapter reported and explained very high response rates and good reliabilities. This chapter noted that many features build up the robust methodological quality of longitudinal research incorporating a complete panel design.

Chapter 6 Results

6.1 Hypotheses testing: causality

This section tests hypotheses in three stages. Firstly, the four-factor model ($XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$) was tested without the influence of authentic leadership; secondly, the four-factor model was either disproved or confirmed; then the five-factor model was tested via the addition of the authentic leadership factor $AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$. Thirdly, the five-factor model mediations were tested. In each of the above stage, this study using *Mplus* v.5.2 (Muthén and Muthén, 1998–2007) and strictly follows Jöreskog's (1993) the three-step framework for SEM testing (discussed in Section 5.9.2): The first step is to postulate the baseline model on basis of hypotheses. The second step is to propose alternative nested models and find whether there is a better model. The third step is to generate the best model in representing the sample data. In the assessment of mediations, this study follows the process for mediation test (Flow chart 5-1, discussed in Section 5.9.1). At the end, conclusions are made to represent the result of hypotheses testing.

In the same manner hypotheses testing are discussed at both the individual and team level.

6.1.1 Individual level

The correlations (see Table 5–8) between authentic leadership and role model ($r = .29, p < .001$), role model and PsyCap ($r = .36, p < .001$), PsyCap and work competence ($r = .37, p < .001$), and work competence and OCB ($r = .63, p < .001$) are all significant, providing preliminary evidence in support of the hypotheses.

Table 6–1: Four-factor SEM, individual level (N=620)

Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR		df	p, Sig.	Sig. correlation
null Model												
Baseline Model	4 factors: XRM→XPSY→XCP→XOCB	178.238	87	0.97	0.963	0.041	0.955	0.037				
	<i>Alternative paths without adding new path</i>											
Model 1	XRM→XPSY→XOCB→XCP	192.144	87	0.965	0.958	0.044	0.869	0.041	13.91	0	0.00	Sig.
Model 2	XRM→XCP→XPSY→XOCB	474.671	87	0.871	0.844	0.085	0	0.104	296.43	0	0.00	Sig.
Model 3	XRM→XCP→XOCB→XPSY	256.253	87	0.944	0.932	0.056	0.102	0.071	78.02	0	0.00	Sig.
Model 4	XRM→XOCB→XPSY→XCP	481.551	87	0.866	0.841	0.086	0	0.105	303.31	0	0.00	Sig.
Model 5	XRM→XOCB→XCP→XPSY	264.489	87	0.947	0.936	0.054	0.117	0.07	86.25	0	0.00	Sig.
Model 6	XPSY→XRM→XCP→XOCB	230.609	87	0.952	0.942	0.052	0.36	0.07	52.37	0	0.00	Sig.
Model 7	XPSY→XRM→XOCB→XCP	235.572	87	0.95	0.94	0.052	0.295	0.072	57.33	0	0.00	Sig.
Model 8	XPSY→XCP→XOCB→XRM	246.489	87	0.947	0.936	0.054	0.177	0.07	68.25	0	0.00	Sig.
Model 9	XPSY→XCP→XRM→XOCB	526.962	87	0.853	0.823	0.09	0	0.132	348.72	0	0.00	Sig.
Model 10	XPSY→XOCB→XCP→XRM	256.253	87	0.944	0.932	0.056	0.102	0.071	78.02	0	0.00	Sig.
Model 11	XPSY→XOCB→XRM→XCP	566.784	87	0.84	0.807	0.094	0	0.142	388.55	0	0.00	Sig.
	<i>Adding new path(s)</i>											
Model 12	XRM→XPSY→XOCB; XRM→XPSY→XCP; XCP→XOCB	178.232	86	0.969	0.962	0.042	0.946	0.037	-0.01	-1	0.94	No Sig.
Model 13	XRM→XPSY→XCP→XOCB; XRM→XCP	177.426	86	0.97	0.963	0.041	0.949	0.036	-0.81	-1	0.37	No Sig.
Model 14	XRM→XPSY→XCP→XOCB; XRM→XOCB	178.177	86	0.969	0.962	0.042	0.946	0.037	-0.06	-1	0.80	No Sig.
Model 15	XRM→XPSY→XCP→XOCB; XRM→XCP;XRM→XOCB	177.406	85	0.969	0.962	0.042	0.938	0.036	-0.83	-2	0.66	No Sig.

6.1.1.1 Stage 1: 4-factor SEM ($XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$)

Using SEM to test hypotheses, the first step is to postulate the baseline model on basis of the four-factor related hypotheses. Therefore, the baseline model is $XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$, indicating a fully mediated model. The baseline model shows an close fit with the sample data, with all fit indices indicative of a good structural model to explain the paths ($\chi^2 = 178.24$; $df = 87$; CFI = .97; TLI = .96; RMSEA = .04; SRMR = .04). The second step is to propose alternative nested models as competing models (See Table 6–5; Details the fit indices statistics for the alternative models). Against the baseline model, this study tested 15 nested models. Models 1–11 are alternative models adjusting the path of the four factors without adding a new path. In line with the correlations, all paths are significant. These models have the same degrees of freedom as the baseline model; however, the goodness-of-fit indices indicate a poorer structure models. Therefore, Models 1–11 are rejected. Next, this study adds new paths among the four factors (Models 12–15).

But results indicate neither significant paths exist nor significant difference to the baseline model; that is, Model 12 (add one direct path from XPsyCap to XOCB) shows no significant path from PsyCap to OCB ($\beta = .004$, $p = .940$). Model 13 (add one direct path from XRM to XCP) shows the added path is not significant ($\beta = .001$, $p = .370$). This analysis of the SEM indicates that all the added paths in Models 12–15 are non-significant. In addition, according to the model comparison, the results from SEM were found to be statistically non-significant on the basis of the chi-square difference. It double confirms that the added paths are non-existent and the added paths can not improve the model fit. Therefore, Models 12–15 are rejected although they have similar model fit indices with the baseline model. The third step is to generate the best model. In sum, four-factor SEM indicates that the baseline model

($XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$) is the best with close fit ($\chi^2 = 178.24$; $df = 87$; CFI = .97; TLI = .96; RMSEA = .04; SRMR = .04). All other alternative models are rejected.

(Insert Table 6–1: four-factor SEM individual level)

6.1.1.2 Stage 2: five-factor SEM ($AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$)

Table 6–2: Five-factor SEM, individual level (N=620)

Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR		df	p, Sig.	Sig. correlation
Measurement model	AL \leftrightarrow XRM \leftrightarrow XPSY \leftrightarrow XCP \leftrightarrow XOCB	229.295	142	0.976	0.971	0.031	1	0.034				
Baseline Model	5factors: AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB	235.293	148	0.976	0.972	0.031	1	0.037				
	<i>Adding new path</i>											
Model 1	AL \rightarrow XPSY	230.75	147	0.977	0.973	0.03	1	0.034	52.51	60	0.53	No Sig.
Model 2	AL \rightarrow XCP	234.899	147	0.976	0.972	0.031	1	0.037	56.66	60	0.93	No Sig.
Model 3	AL \rightarrow XOCB	235.285	147	0.976	0.972	0.031	1	0.037	57.05	60		
	4 factors: baseline XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB	178.238	87	0.97	0.963	0.041	0.955	0.037	0.00	0	0.62	

Five-factor SEM was tested by adding AL to the best four-factor structural equation model. As Table 6–2 correlations indicated, there is significant correlation between AL and XRM ($r = .29$, $p < .001$) but not with other factors; therefore, AL is added as a predicable factor of XRM.

Using SEM to test hypotheses, the first step is to postulate the baseline model on basis of the five-factor related hypotheses. As discussed in Section 6.2.1.1 the baseline model is $AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$, indicating a fully mediated model. The baseline model shows a close fit with the sample data, with all fit indices indicative of a good structural model to explain the paths ($\chi^2 = 229.30$; $df = 142$; CFI = .98; TLI = .97; RMSEA = .03; SRMR = .03). The second step is to propose alternative nested models as competing models (See Table 6–6; Details the fit indices statistics for the alternative models). Against the baseline model, this study tested 3 alternative nested models. Three additional paths from AL to other factors were added in the five-factor model (Models 1–3). Neither significant path nor significant difference was discovered; that is, Model 1 (add a path from AL to XPSY) shows no significant path existed ($\beta = .10$, $p = .53$). Concerning the other point, Model 1 is not significantly, compared with the baseline ($\chi^2 = 230.75$; $df = 147$; CFI = .98; TLI = .97; RMSEA = .03; SRMR = .03). For Models 2 and 3 (add a path from AL to XCP and XOCB separately), the added paths are not significant. This analysis of the SEM indicates that all the added paths in Models 1–3 are non-significant. In addition, according to the model comparison, the results from SEM were found to be statistically non-significant on the basis of the chi-square difference. It double confirms that the added paths are non-existent and the added paths cannot improve the model fit. Therefore, Models 1–3 are rejected although they have similar model fit indices with the baseline model. The third step is to generate the best model. In sum, five-factor SEM indicates that the baseline model ($AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$) is the best with close fit ($\chi^2 =$

229.30; $df = 142$; CFI = .98; TLI = .97; RMSEA = .03; SRMR = .03). All other alternative models must be rejected.

(Insert Table 6–2: five-factor SEM individual level)

6.1.1.3 Stage 3: mediation testing ($AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$)

Five-factor structure equation model ($AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB$) has been identified as the best model because all alternative nested models have been rejected. This stage is to assess the mediation relationships among these five factors. According to the process for mediation test (Flow chart 1, discussed in Section 5.9.1), there are two steps in mediation test. The first step is to assess whether there is mediation by testing effects from the predictor (X) to Mediator (M), from the Mediator (M) to dependent effect (Y), and from the predictor to dependent variable via mediator (independent (X) \rightarrow Mediator (M) \rightarrow dependent effect (Y)). When the evidence is clear that statistically significant direct paths ($X \rightarrow M$, $M \rightarrow Y$), and indirect path ($X \rightarrow M \rightarrow Y$) exist simultaneously, it can be concluded that the model is mediated. The second step is to identify whether the mediation is full or partial by testing the direct part from the independent (X) to dependent effect (Y), when findings indicate an existence of mediation in the first step. A significant path indicates a partial mediation, and non-significant as full mediation.

To sum up, this study adopt two steps (Flow chart 1, discussed in Section 5.9.1) on mediation testing. Using SEM is an advantage because it allows testing the direct and indirect paths simultaneously.

The first step: testing the direct paths ($X \rightarrow M$; $M \rightarrow Y$) and indirect paths ($X \rightarrow M \rightarrow Y$)

The first step tests the direct paths ($X \rightarrow M$; $M \rightarrow Y$) and indirect paths ($X \rightarrow M \rightarrow Y$). This study tests such effects with regression from AL to XRM, XRM to XPSY, XPSY to XCP, XCP to XOCB. The path coefficients are illustrated in the Figure 6–1 and show there are statistically significant direct paths. For example, the coefficients for the effects of AL on XRM, is .590 at the $p < .001$ level. The coefficients for the effects of XRM on XPSY, is .264 at the $p < .001$ level. To test the indirect paths, from the predictor to dependent variable via mediator (independent (X) \rightarrow Mediator (M) \rightarrow dependent effect (Y)), this study tests whether AL predicts XPSY via XRM; XRM predicts XCP via XPSY; XPSY predicts XOCB via XCP. The indirect effects are illustrated in Table 6–3 and indicate that there are statistically significant indirect effects. In each indirect path, the value of indirect effect is close to the product of the related coefficients, indicating a full mediation effects. For example, the estimated indirect effect for AL to XPSY through XRM (i.e. .156) is the product of the coefficients for the effects of AL on XRM, and XRM on XPSY; $.590 * .264 = .156$. This effect is statistically significant at the $p < .0001$ level, strongly supporting the hypothesis that XRM mediates the effect of AL on XPSY ($AL \rightarrow XRM \rightarrow XPSY$). The effects of XRM on XCP, and XPSY on XOCB are also statistically significant at the $p < .001$ level; therefore, XPSY and XCP are also mediators of the effects of XRM on XCP ($XRM \rightarrow XPSY \rightarrow XCP$), and XPSY on XOCB ($XPSY \rightarrow XCP \rightarrow XOCB$). But the estimated indirect effect for XRM to XOCB ($\beta = .023$, $p = .422$) through XCP, and AL to XCP ($\beta = .025$, $p = .426$) through XRM does not exist, suggesting that the estimated mediation paths ($XRM \rightarrow XCP \rightarrow XOCB$; $AL \rightarrow XRM \rightarrow XCP$) are not supported.

In sum, results in the first step indicate that there are statistically significant direct paths ($X \rightarrow M$; $M \rightarrow Y$), from the predictor (X) to the Mediator (M), and from the Mediator (M) to the

dependent effect (Y), and indirect paths ($X \rightarrow M \rightarrow Y$), from the predictor (X) to the dependent effect (Y) via the Mediator (M). All the significance of paths is at the .001 level.

Table 6–3: Five-factor SEM, mediation test, individual level (N=620)

Model	Specific indirect paths	Indirect effect	Product of coefficients
AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB XRM \rightarrow XCP	AL \rightarrow XRM \rightarrow XPSY	.156***	= (.590 * .264) = .156
	XRM \rightarrow XPSY \rightarrow XCP	.194***	= (.264 * .736) = .194
	XPSY \rightarrow XCP \rightarrow XOCB	.455***	= (.736 * .551) = .406
	XRM \rightarrow XCP \rightarrow XOCB	Nonexistent .023 ($p = .422$)	
	AL \rightarrow XRM \rightarrow XCP	Nonexistent .025 ($p = .426$)	

The second step: testing the direct path ($X \rightarrow Y$)

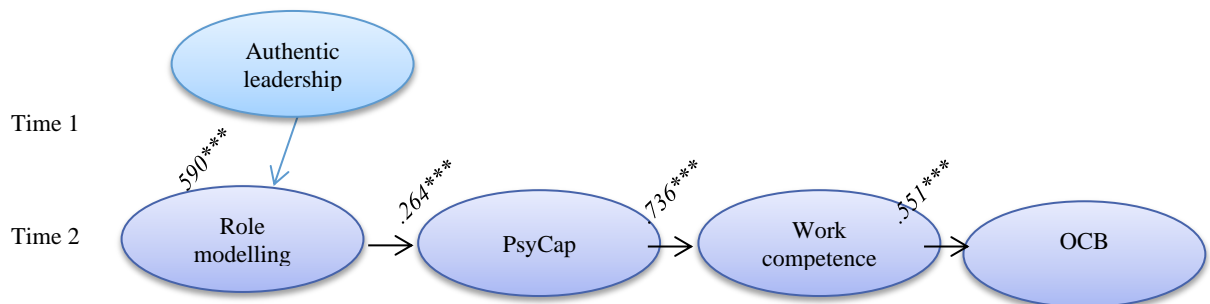
The second step add direct paths from independent variable (X) to the dependent variable (Y) in the mediation model then test each of the direct effect. This study tests the regression paths from from AL, XRM, XPSY upon XPSY, XCP, XOCB, respectively. The evidence shows that there is no statistically significant direct effect.

To sum up, testings in the two steps produce the result that the baseline model (AL \rightarrow XRM \rightarrow XPSY \rightarrow XCP \rightarrow XOCB) is a fully mediated model. To double check this, this study compares the two structural equation models (full or partial mediation) following the guidance discussed in Section 5.9.4. In the first step the output shows an excellent strong fit to the data, according to goodness-of-fit indices: ($\chi^2 = 235.293$; $df = 148$; CFI = .98; TLI = .97; RMSEA = .03; SRMR = .03). In the second step the output shows a strong fit to the data, according to goodness-of-fit indices: ($\chi^2=230.07$; $df=145$; CFI=.98; TLI=.97; RMSEA=.03; SRMR=.03). The output in the second step shows a trivial decrease fit to the data comparing with the output in the first step. It indicates that adding direct paths in the second step is unlikely to produce a

better fit to the data. A chi-squared difference test of the partially mediated model versus the fully mediated model gives the following result: $\Delta\chi^2=230.074-235.293=5.219$ on $\Delta df=3$; $p>.001$ ($p=.156$). The chi-squared difference is not at significance level. The rest of fit indices of the partially mediated model are the same as those of fully mediated model. Hence, a conclusion can be made that the three direct paths added (from the independent to the dependent variables in the second step) did not explain any additional effects against the fully mediation model. Hence, the partially mediation model is rejected.

To conclude, the results support hypothesis 1a, 1b, 1c 2a, 2b, 3a, and 3b at individual level. All of the indirect paths are fully mediated in nature. A full mediated model resulted from the SEM is represented in Figure 6-1.

Figure 6–1: A fully mediated model, individual level (N=620)



6.1.2 Team level

The correlations (See Table 5–9) between authentic leadership and role model ($r = .40, p < .001$), role model and PsyCap ($r = .47, p < .001$), PsyCap and work competence ($r = .63, p < .001$), and work competence and OCB ($r = .49, p < .001$) are all significant, providing preliminary evidence in support of the hypotheses. In addition findings indicate a significant correlations between AL and XLCP ($r = .28, p < .01$), and strong significant correlation between RM and XLCP ($r = .79, p < .001$). This suggests the possibility of additional new paths at team level.

6.1.2.1 Stage 1: Four-factor SEM ($XRM \rightarrow XPSY \rightarrow XLCP \rightarrow XOCB$)

Using SEM to test hypotheses, the first step is to postulate the baseline model on basis of the four-factor related hypotheses. Therefore, the baseline model is $XRM \rightarrow XPSY \rightarrow XLCP \rightarrow XOCB$, indicating a fully mediated model. The baseline model shows a poor fit with the sample data, with all fit indices indicative of an unacceptable structural model to explain the paths ($\chi^2 = 183.15$; $df = 87$; CFI = .89; TLI = .86; RMSEA = .12; SRMR = .16). Therefore the base line model is rejected.

To find a better model the second step is to propose alternative nested models (See Table 6–4; Details the fit indices statistics for the alternative models). this study tested 19 nested models. Models 1–11 are alternative fully mediating models adjusting the path of the four factors without adding a new path. In line with the correlations, all paths are significant. These models have the same degrees of freedom as the baseline model; however, the model fit indices show that these competing models are worse than baseline model. Therefore, Models 1–11 are rejected. Next this study tested partially meditated models without adding a new path (Models

12–15). Results indicate three models (number 13, 14, 15) could not be computed due to convergence. Model 12 can be computed but the result indicates poor goodness-of-fit indices. Next, this study tested alternative models by adding additional paths (Models 16–19). Results indicate Model 16 (reverse XLCP and XOCB, and add one direct part from XRM to XLCP) cannot be computed due to convergence. Result indicates Model 17 (reverse XLCP and XOCB, and add one direct part from XRM to XOCB) indicates non-existent path from XRM to XOCB ($\beta = .098, p = .314$) with poor goodness-of-fit indices. Model 18 (add one direct path from XPsyCap to XOCB) indicates non-existent path from PsyCap to OCB ($\beta = .011, p = .954$). Model 18 (add one direct path from XPsyCap to XOCB) is rejected although it shares the similar model fit indices with the baseline model. This is because that the above analysis of the SEM indicates that the effect of the added path (from XPsyCap to XOCB) is non-significant. In addition, according to the model comparison, the results from SEM were found to be statistically non-significant on the basis of the chi-square difference. It double confirms that the effect of the added path is non-existent and the added path cannot improve the model fit. Results indicate Model 19 (add one direct path from XRM to XLCP) indicates a significant path from XRM to XLCP ($\beta = .427, p = .001$), with all goodness-of-fit indices indicative of acceptable structural model to explain the paths ($\chi^2 = 131.41; df = 86; CFI = .95; TLI = .94; RMSEA = .08; SRMR = .10$). This analysis indicates that the effect of the added path from XRM to XLCP in Model 19 is statistically significant and the added path dramatically improves the model fit against the initial baseline model. The third step is to generate the best model. In sum, four-factor SEM indicates that the initial baseline model ($XRM \rightarrow XPSY \rightarrow XLCP \rightarrow XOCB$) is not the best model due to its poor goodness-of-fit indices ($\chi^2 = 183.15; df = 87; CFI = .89; TLI = .86; RMSEA = .12; SRMR = .16$). The best model which is the new baseline model ($XRM \rightarrow XPSY \rightarrow XLCP \rightarrow XOCB; XRM \rightarrow XLCP$) is significantly better against the initial

baseline structure model, with all fit indices indicative of acceptable structural model to explain the paths ($\chi^2 = 131.41$; $df = 86$; CFI = .95; TLI = .94; RMSEA = .08; SRMR = .10). Therefore, the initial baseline model as well as other alternative models is rejected.

Table 6–4: Four-factor SEM, team level (N=87)

Model	factors	χ^2	df	CFI	TLI	RMSE A	P	SRMR
Old Baseline Model	4 factors: XRM → XPSY → XLCP → XOCB;	183.145	87	0.887	0.864	0.115	0	0.159
New Baseline	XRM → XPSY → XLCP → XOCB; XRM → XLCP	131.412	86	0.947	0.935	0.079	0.048	0.103
<i>Alternative paths without adding new path</i>								
Model 1	XRM → XPSY → XOCB → XLCP	199.816	87	0.867	0.84	0.124	0	0.196
Model 2	XRM → XLCP → XPSY → XOCB	183.145	87	0.887	0.864	0.115	0	0.159
Model 3	XRM → XLCP → XOCB → XPSY	150.749	87	0.925	0.91	0.093	0.005	0.161
Model 4	XRM → XOCB → XPSY → XLCP	199.662	87	0.868	0.84	0.124	0	0.206
Model 5	XRM → XOCB → XLCP → XPSY	185.62	87	0.884	0.86	0.116	0	0.184
Model 6	XPSY → XRM → XLCP → XOCB	146.869	87	0.93	0.915	0.091	0.008	0.128
Model 7	XPSY → XRM → XOCB → XLCP	201.691	87	0.865	0.837	0.125	0	0.207
Model 8	XPSY → XLCP → XOCB → XRM	185.62	87	0.884	0.86	0.116	0	0.184
Model 9	XPSY → XLCP → XRM → XOCB	145.64	87	0.931	0.917	0.09	0	0.117
Model 10	XPSY → XOCB → XLCP → XRM	150.747	87	0.925	0.91	0.093	0	0.161
Model 11	XPSY → XOCB → XRM → XLCP	157.935	87	0.917	0.899	0.099	0.001	0.173
<i>Alternative paths adding new path</i>								
Model 12	XRM → XPSY → XOCB; XRM → XPSY → XLCP; XOCB WITH XLCP	182.996	86	0.886	0.861	0.116	0	0.161
Model 13	XRM → XPSY → XOCB; XRM → XPSY → XLCP; XOCB → XLCP							
Model 14	XRM → XPSY → XOCB; XRM → XPSY → XLCP; XLCP → XOCB							
Model 15	XRM → XPSY; XRM → XLCP; XRM → XOCB; XOCB WITH XLCP; XPSY WITH XLCP; XOCB WITH XPSY							
<i>Add additional paths from XRM</i>								
Model 16	XRM → XPSY → XLCP → XOCB; XRM → XLCP							
Model 17	XRM → XPSY → XLCP → XOCB; XRM → XOCB	182.12	86	0.887	0.862	0.115	0	0.173
<i>Add additional paths from XPSY</i>								
Model 18	XRM → XPSY → XLCP → XOCB; XPSY → XOCB	131.409	85	0.945	0.933	0.081	0.041	0.103
Model 19	XRM → XPSY → XLCP → XOCB; XRM → XLCP	131.412	86	0.947	0.935	0.079	0.048	0.103

Table 6–5: Five-factor SEM, team level (N=87)								
Model	factors	χ^2	df	CFI	TLI	RMSEA	P	SRMR
Baseline Model 4 factors	XRM→XPSY→XLCP→XOCB; XRM→XLCP	131.412	86	0.947	0.935	0.079	0.048	0.103
Baseline Model 5 factors	AL→XRM→XPSY→XLCP→XOCB XRM→XLCP	194.779	147	0.961	0.954	0.062	0.2	0.108
Model 1	AL→XRM→XPSY→XLCP→XOCB AL→XPSY	246.057	147	0.918	0.905	0.09	0.001	0.148
Model 2	AL→XRM→XPSY→XLCP→XOCB XRM→XLCP; AL→XPSY	194.639	146	0.96	0.953	0.063	0.186	0.107
Model 3	AL→XRM→XPSY→XLCP→XOCB XRM→XLCP; AL→XLCP	194.179	147	0.96	0.953	0.063	0.192	0.108
Model 4	AL→XRM→XPSY→XLCP→XOCB AL→XLCP	244.639	147	0.919	0.906	0.089	0.001	0.143
Model 5	AL→XRM→XPSY→XLCP→XOCB	246.308	148	0.919	0.906	0.089	0.001	0.149

6.1.2.2 Stage 2: Five-factor SEM ($AL \rightarrow XRM \rightarrow XPSY \rightarrow XLCP \rightarrow XOCB$; $XRM \rightarrow XLCP$)

Five-factor SEM was tested by adding AL to the best four-factor structural equation model. As the correlations in Table 6–5 indicated, there are significant correlations between AL and XRM ($r = .40, p < .001$), and AL and XLCP ($r = .28, p < .01$); therefore, AL is added as a predicable factor of XRM. The effect of AL on XLCP is tested as one of the alternative models.

Using SEM to test hypotheses, the first step is to postulate the baseline model. As discussed in Section 6.2.2.1 the baseline model is ($AL \rightarrow XRM \rightarrow XPSY \rightarrow XLCP \rightarrow XOCB$; $XRM \rightarrow XLCP$), indicating a mediation model with bot full and partial mediators. The baseline model shows acceptable fit with the sample data, with all fit indices indicative of a good structural model to explain the paths ($\chi^2 = 194.78$; $df = 147$; $CFI = .96$; $TLI = .95$; $RMSEA = .06$; $SRMR = .10$). The second step is to propose alternative nested models as competing models (See Table 6–9; Details the fit indices statistics for the alternative models). Against the baseline model, this study tested alternative models (Models 1–5). Model 1 is established by adding the path from AL to XPSY, and removing the path from XRM to XLCP; Model 2-3 are established by adding the path from AL to XPSY and XLCP separately; Model 4 is adding the path from AL to XLCP and removing the path from XRM to XLCP; Model 5 is removing the path from XRM to XLCP. Results indicate that some of the alternative models are much poorer structural models, compared with the baseline model. For example, result of Model 1 indicates the fit indices ($\chi^2 = 246.06$; $df = 147$; $CFI = .92$; $TLI = .91$; $RMSEA = .09$; $SRMR = .15$) were indicative of an unacceptable good-of-fit indices. Moreover, all the additional paths added in these models are not significantly existent. For example, result of Model 4 indicates non-existent path from AL to XLCP ($\beta = .17, p = .22$) with a poor fit indices ($\chi^2 = 244.64$; $df = 147$; $CFI = .92$; $TLI = .91$; $RMSEA = .09$; $SRMR = .14$). Results also indicate that Model 2 (add one

direct path from AL to XPsyCap) ($\chi^2 = 194.64$; $df = 146$; CFI = .96; TLI = .95; RMSEA = .06; SRMR = .10) and Model 3 (add one direct path from AL to XLCP) ($\chi^2 = 194.18$; $df = 147$; CFI = .96; TLI = .95; RMSEA = .06; SRMR = .10) have almost non-changed model fit indices, compared with the baseline model ($\chi^2 = 194.78$; $df = 147$; CFI = .96; TLI = .95; RMSEA = .06; SRMR = .10). In addition, the added paths in Models 2–3 are non-significant. This analysis of the SEM and model comparison indicates that the effects of added paths in Models 2–3 are non-existent and the added paths cannot improve the model fit. Therefore, Models 2–3 are rejected although they have similar model fit indices with the baseline model. The third step is to generate the best model. In sum, five-factor SEM indicates that the baseline model (AL→ XRM→XPSY→XLCP→XOCB; XRM→XLCP), is the best with good fit ($\chi^2 = 194.78$; $df = 147$; CFI = .96; TLI = .95; RMSEA = .06; SRMR = .10). Therefore, all the alternative nested models are rejected (Models 1–5).

In sum, result indicates that the best model (AL→ XRM→XPSY→XLCP→XOCB; XRM→XLCP) is a partially mediated model.

6.1.2.3 Stage 3: mediation testing (AL→ XRM→XPSY→XLCP→XOCB; XRM→XLCP)

Five-factor structure equation model (AL→ XRM→XPSY→XLCP→XOCB; XRM→XLCP) has been identified as the best model because all alternative nested models have been rejected. This stage is to assess the mediation relationships among these five factors. In the same way as mediation testing for the individual level, this study adopt two steps (Flow chart 1, discussed in Section 5.9.1) on mediation testing at the team level.

The first step: testing the direct paths (X→M; M→Y) and indirect paths (X→M→Y)

The first step tests direct paths from the predictor (X) to the Mediator (M), and from the Mediator (M) to the dependent effect (Y), and indirect paths from the predictor (X) to the dependent effect (Y) via the Mediator (M). This study tests the direct paths with regression from AL to XRM, XRM to XPSY, XPSY to XLCP, XLCP to XOCB, and XRM to XLCP. The path coefficients are illustrated in the Figure 6–2 and show there are statistically significant direct paths. For example, the coefficient for the effect of AL on XRM, is .582 at the $p < .001$ level. The coefficient for the effect of XLCP on XOCB, is .427 ($p = .032$) at the $p < .05$ level. The coefficient for the effect of XRM on XLCP, is .517 at the $p < .001$ level. To test the indirect paths, from the predictor to dependent variable via mediator (independent (X)→Mediator (M)→dependent effect (Y)), this study tests whether AL predicts XPSY via XRM, XRM predicts XLCP via XPSY, XPSY predicts XOCB via XLCP, XRM predicts XOCB via XPSY XLCP, and AL predicts XLCP via XRM. The indirect effects are illustrated in Table 6–6 and indicate that there are statistically significant indirect effects. In each indirect path, the value of indirect effect is close to the product of the related coefficients, and all show statistically significant effects. For example, the estimated indirect effect from AL to XPSY through XRM (i.e. .07) is the product of the coefficients for the effects of AL on XRM, and XRM on XPSY; $.582 * .117 = .07$. This effect is marginally significant at the $p < .1$ level, supporting the hypothesis that XRM mediates the effect of AL on XPSY (AL→ XRM→XPSY). The indirect effect, XRM on XLCP (XRM→XPSY→XLCP), is .06 ($p = .073$), marginally hit the significant level if the p value is reduced to $p < .10$. The indirect effect, XPSY on XOCB (XPSY→XLCP→XOCB), is .22 ($p = .038$), statistically significant at the $p < .05$ level. The indirect effect, XRM on XOCB (XRM→XLCP→XOCB), is .22 ($p = .001$) statistically

significant at the $p < .001$ level. The indirect effect, AL on XLCP ($AL \rightarrow XRM \rightarrow XLCP$), is .30 ($p=.006$), statistically significant at the $p < .01$.

In sum, results in the first step indicate that there are statistically significant direct paths ($X \rightarrow M$; $M \rightarrow Y$), from the predictor (X) to the Mediator (M), and from the Mediator (M) to the dependent effect (Y), and indirect paths ($X \rightarrow M \rightarrow Y$), from the predictor (X) to the dependent effect (Y) via the Mediator (M). The significance of paths varies at the .001, .05, .01, and .10 levels.

Table 6–6: Five-factor SEM, mediation test, team level (N=87)

Model	Specific indirect paths	Indirect paths	Product of coefficients
AL→XRM→XPSY→XLCP→XOCB XRM→XLCP	AL→XRM→XPSY	.07 ($p = .097$)	$= (.582 * .117) = .068$
	XRM→XPSY→XLCP	.06 ($p = .073$)	$= (.117 * .505) = .059$
	XPSY→XLCP→XOCB	.22* ($p = .038$)	$= (.505 * .427) = .216$
	XRM→XLCP→XOCB	.22*** ($p = .001$)	$= (.427 * .517) = .225$
	AL→XRM→XLCP	.30** ($p = .006$)	$= (.582 * .517) = .301$

The second step: testing the direct path (X→Y)

The second step add direct paths from independent variable (X) to the dependent variable (Y) in the mediation model then test each of the direct effect. This study tests the regression paths AL→XPSY, AL→XLCP, XRM→XLCP, XRM→XOCB, XPSY→XOCB, respectively. The evidence shows no statistically significant direct effect except for one direct path from XRM to XLCP (XRM→XLCP). The coefficient for the effect of XRM on XLCP, is .517 at the $p < .001$ level. Hence, the baseline model (AL→ XRM→XPSY→XLCP→XOCB; XRM→XLCP) is unlikely fully mediated.

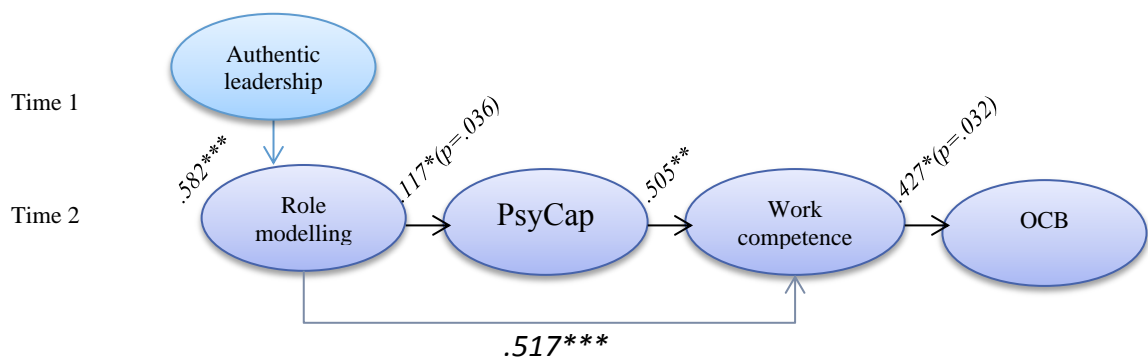
To sum up, the first step provides evidence of mediation. The second step identifies that the baseline model (AL→ XRM→XPSY→XLCP→XOCB; XRM→XLCP) incorporates partial mediators. To double check this, this study compares the two structural equation models (full or partial mediation) following the guidance discussed in Section 5.9.4. In the fully mediated model, the output shows a significant decrease fit to the data according to fit indices:

($\chi^2=246.31$; $df=148$; $CFI=.92$; $TLI=.91$; $RMSEA=.09$; $SRMR=.15$), comparing with the fit indices in the partially mediated model ($\chi^2 = 194.78$; $df = 147$; $CFI = .96$; $TLI = .95$; $RMSEA = .06$; $SRMR = .10$). It indicates that adding direct paths (XRM→XLCP) in the second step likely produces a better fit to the data. A chi-squared difference test of the partially mediated model

versus the fully mediated model gives the following result: $\Delta\chi^2=246.31-194.78=51.53$ on $\Delta df=1$; $p<.0001$. The chi-squared difference is at significance level. And conclusion can be made that the direct paths (from XRM to XLCP) added did explain additional effects against the fully mediation model. Hence, the fully mediation model can be rejected. Therefore, Hypotheses 1c, 2b, 3b are supported.

To conclude, results support hypothesis 1a, 1b, 1c, 2a, 3a, and 3b at team level. Hypothesis 2b is not supported at team level, that is, findings indicate that the mediation role of PsyCap between role modelling and work competence is partially rather than fully. A partially mediated model resulted from the SEM is represented in Figure 6-2.

Figure 6–2: A partially mediated model, team level (N=87)



6.2 Hypotheses testing: effects of PCI training

6.2.1 Effects on supervisor PsyCap

Data of supervisor PsyCap were collected before and after PCI training. There are 39 supervisors in PCI group and 48 in NPCI group as introduced in Section 6.1. The mean score was computed using SPSS 19 (See Table 6–7). There was a statistically significant increase in supervisor PsyCap score from Time 1 (M=4.32, SD=.24) to Time 2 (M=4.47, SD=.19), $p < 0.001$ (two-tailed). The mean increase in supervisor PSyCap scores was 0.15 (3.5%) with 95% confidence interval ranging from 0.07 to 0.23. For the NPCI group PsyCap score decrease by 0.04 (.0.9%) from Time 1 (M=4.37, SD=.19) to Time 2 (M=4.33, SD=.21), $p < 0.001$ (two-tailed). The result indicates that the PCI group shows increase in supervisor's PsyCap, while the NPCI group show trivial reduction from Time 1 to Time 2. This finding is in line with previous PCI study by Luthans et al., (2008b), reporting that PsyCap increase in PCI group was 0.12 (2.6%) whereas PsyCap decrease in NPCI group was 0.05 (1.1%).

Table 6–7: Supervisor PsyCap pre-and-post PCI, PCI versus NPCI group

($N_{\text{PCI}}=300$, $N_{\text{NPCI}}=320$)

PsyCap	Time 1	Time 2
Supervisor in PCI group	4.32	4.47
Supervisor in NPCI group	4.37	4.33

It is suggested by researchers (e.g. Pallant 2010) that independent-samples t-test is appropriate test when comparing the mean scores of two different groups of people or conditions. This study conducts independent-samples t-test to compare the mean score on supervisor PsyCap between the PCI and NPCI group. The results of the analysis were presented in Table 6–8 and

Table 6–9. Results indicate significant difference of supervisor PsyCap in the mean change for PCI groups ($M=.15$, $SD=.24$) and NPCI groups ($M=-.04$, $SD=.22$), $p<0.001$ (two-tailed).

Further, the magnitude of the difference in the means change (mean difference $=.19$) was large (eta squared $=.15$) based on the criteria suggested by Cohen (1998, p. 284-287), noting that the effect is regarded as small if the value of eta square is .01, moderate effect for eta square of .06, and large effect for eta square of .15.

Table 6–8: Independent-samples t-test: significance of mean difference on supervisor PsyCap

Group Statistics_ team level						
	PsyCap	PCI_mean	N	Mean	Std. Deviation	Std. Error Mean
1	Mean difference	1	39	.15	.24	.04
		2	48	(.04)	.22	.03

Table 6–9: Independent-samples t-test : Levene's test for equality of variance

Levene's Test for Equality of Variance				t-test for Equality of Means				effect size
	PsyCap	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	eta squared
1	Mean difference	.005	.943	3.817	82	.000	.19	.15

In sum, supervisor's PsyCap increase in the PCI group, while there is trivial PsyCap decrease in the NPCI group from Time 1 to Time 2. Results indicate a significantly greater mean score on supervisor PsyCap in PCI group than in NPCI group. Hence, hypothesis 4a is supported.

6.2.1 Transmission effect on employees

This section tests the transmission effect of PCI training on the consequences of authentic leadership. Using *Mplus* v.5.2 (Muthén and Muthén, 1998–2007), this study conducted a two-

group analysis to test for invariance in structural parameters comparing the PCI and NPCI groups. Following the guidance of Byrne (2012), all existing structural paths are added, then compared with the unconstrained and constrained models at both individual and team levels. In the unconstrained model, all estimated parameters are allowed to vary freely across the two groups. In the constrained model, factor loadings, variances, and covariances are all set to be equal across the two groups. According to this study of van Hooft et al., (2006), a significant difference occurs between the two groups when the change of CFI and TLI is greater than .01.

6.2.1.1 Two groups analysis: 300 PCI versus 320 NPCI individual level

At individual level, the unconstrained model provided an exceptionally good fit (MLM $\chi^2 = 379.260$; $df = 296$; CFI = .983; TLI = .980; RMSEA = .030; SRMR = .041), as did the constrained model (MLM $\chi^2 = 525.799$; $df = 333$; CFI = .961; TLI = .959; RMSEA = .043; SRMR = .063). According to the criteria of model evaluation discussed in Section 5.9.3, result indicates that both models have good model fit. But the unconstrained model fits better than the constrained one given that the values of MLM chi-square, df , RMSEA, and SRMR are much smaller, but the values of CFI and TLI are much greater in the unconstrained than the constrained model.

Next, this study further examines the magnitude of the difference. Firstly, this study computes the MLM chi-square difference test. The result (MLM $\Delta\chi^2 = 146.539$ on $\Delta df = 37$; $p = .0000 < .001$) indicates a statistically significant difference between the two groups (Bentler, 1990; Bollen, 1989; Jöreskog, 1993). Next, verification of these conclusions' evidence was also obtained from the two-group analysis. The changes in CFI and TLI were 0.022 and 0.021, greater than 0.01, respectively. Indeed, the changes in CFI and TLI were greater than the 0.01 that has been offered as an appropriate critical value when assessing invariance across groups

(Cheung and Rensvold, 2002; van Hooft et al., 2006), indicating that model fit for the unconstrained model was much better than it was for the constrained model. Clear evidence of structural variance was obtained, suggesting a significant difference in structural paths between PCI and NPCI samples, thus providing strong support for the divergent effects suggested by Hypothesis 4b. Hence, Hypothesis 4b is supported.

Table 6–10: Two-group analysis (PCI versus NPCI), selected goodness-of-fit statistics, constrained versus unconstrained model, individual level ($N_{\text{PCI}}=300$, $N_{\text{NPCI}}=320$)

Chi-square Test of Model Fit			Difference
Value	Unconstrained	Constrained	
	379.260*	525.799*	146.539
Degrees of Freedom	296	333	37
<i>P</i> -value	0.0008	0	–0.0008
Scaling Correction Factor	1.021	1.026	0.005
Chi-square Contributions from Each Group			
NPCI: $N = 320$	173.03	244.213	71.183
PCI: $N = 300$	206.847	277.863	71.016
CFI	0.983	0.961	.022
TLI	0.98	0.959	.021
RMSEA	0.03	0.043	.013
SRMR	0.041	0.063	.022

6.2.1.2 Mediation test: PCI versus NPCI

This study double checks the causality test using samples from PCI and NPCI groups. The purpose is to test whether previous results are supported with different samples. As Hypotheses

testing 1–3 indicate a fully mediated model at individual level. In the same way as mediation testing in Section 6.2, this study tested the fully mediated model.

As discussed in Section 6.2, to test fully mediated model, one approach is to test the each direct effect and the other approach is to test the indirect relationships. Using the first approach, the direct paths include regression paths from AL to XRM, XRM to XPSY, XPSY to XWC, XWC to XOCB. The path coefficients illustrated in the Figure 6–3 and Figure 6–4 show there are statistically significant direct paths. Using the other approach, indirect effects were tested with results illustrated in Table 6–11, suggesting significant different effects in the paths between PCI and NPCI samples. In each indirect path, the estimated indirect effect is the product of the related coefficients. For example, in the PCI group, the estimated indirect effect for AL to XPSYC through XRM is the product of the coefficients for the effects of AL on XRM, and XRM on XPSY, which is $.820 @ .279 = .228$. This effect is statistically significant at the $p < .001$ level ($p = .000$), strongly supporting the hypothesis that XRM mediates the effect of AL on XPSY. All indirect paths are at a strongly significant level ($p \leq .001$). The output shows a close fit with the data, with both PCI and NPCI groups, according to fit indices: PCI group: ($\chi^2 = 202.759$; $df = 148$; CFI = .97; TLI = .97; RMSEA = .03; SRMR = .05); NPCI group: ($\chi^2 = 208.485$; $df = 147$; CFI = .96; TLI = .96; RMSEA = .04; SRMR = .05).

In sum, two different approaches produce the same result, which is Hypotheses 1a, 1b, 1c, 2a, 2b, 3a, and 3b are all supported at individual level using samples in PCI and NPCI group.

Figure 6–3: A fully mediated model, replicate individual level ($N_{PCI}=300$)

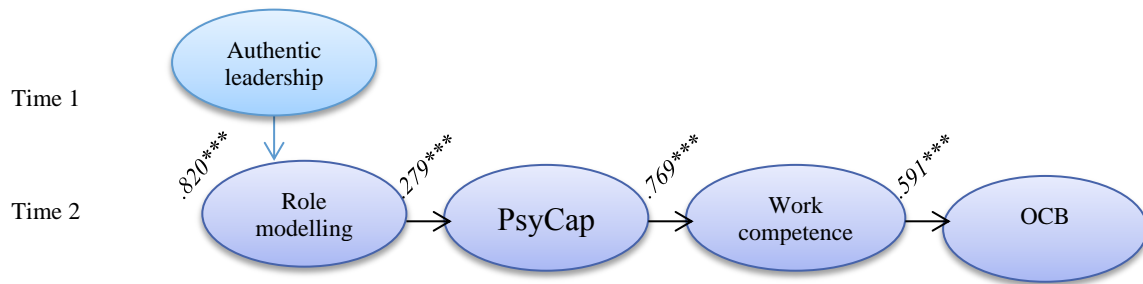
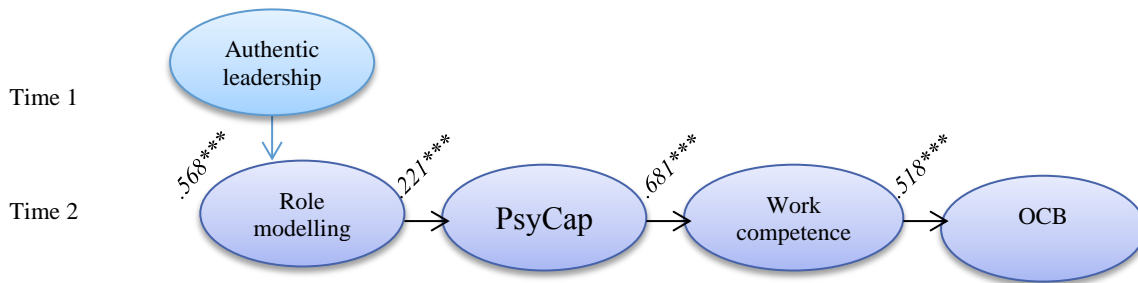


Figure 6–4: A fully mediated model, replicate individual level ($N_{NPCI}=320$)



All the paths are at significant levels in both PCI and NPCI group (Table 6–11), but it also shows that each indirect effects in the structural paths is greater in PCI than NPCI group. This doubly confirms the result concluded from the two-group analysis (Section 6.3.1.1), suggesting significant different effects in the paths between PCI and NPCI samples. Hence, it doubly confirms support for Hypothesis 4b.

Table 6–11: Five-factor SEM, mediation test, replicate individual level ($N_{PCI}=300$, $N_{NPCI}=320$)

	PCI		NPCI	
	Indirect paths	Product of coefficients	Indirect paths	Product of coefficients
AL-XRM-XPSY	.228***	= (.820@.279)= .228	.125***	= (.568@.221)= .126
XRM-XPSY-XWC	.214***	= (.279@.769)= .215	.150 ***	= (.221@.681)= .151
XPSY-XWC-XOCB	.455***	= (.769@.591)= .454	.353***	= (.681@.518)= .353

6.2.1.3 Two groups: 39 PCI versus 48 NPCI team level

At team level, the unconstrained model provided a reasonably good fit (MLM $\chi^2 = 519.851$; $df = 206.23$; CFI = .837; TLI = .814; RMSEA = .13; SRMR = .17), as did the constrained model (MLM $\chi^2 = 597.950$; $df = 281.586$; CFI = .803; TLI = .798; RMSEA = .135; SRMR = .195).

According to the criteria of model evaluation discussed in Section 5.9.3, result indicates that both models have unacceptable model fit. But the unconstrained model fits better than the constrained one given that the values of MLM chi-square, df , RMSEA, and SRMR are much smaller, but the values of CFI and TLI are much greater in the unconstrained than the constrained model. The poor goodness-of-fit indices are likely caused by relative small sample size in the team level, as some of the goodness-of-fit indices are very sensitive to sample size (Browne and Cudeck 1993, p.144). In the same way as in Section 6.3.1.1, this study further examines the magnitude of the difference. The result (MLM $\Delta\chi^2 = 78.099$ on $\Delta df = 33$; ($p = .00002 < .001$) indicates a statistically significant difference between PCI and NPCI groups (Bentler, 1990; Bollen, 1989; Jöreskog, 1993).

Next, verification of these conclusions' evidence was also obtained from the two-group analysis. The changes in CFI and TLI were 0.034 and 0.016, obviously greater than 0.01, respectively. As before (Section 6.3.1.1), the changes in CFI and TLI were greater than the 0.01 that has been offered as an appropriate critical value when assessing invariance across groups (Cheung and Rensvold, 2002; van Hooft et al., 2006), indicating that model fit for the unconstrained model was much better than it was for the constrained model. Clear evidence of structural variance was obtained. This suggests significant difference in the structural paths between PCI and NPCI samples, providing strong support for the divergent effects suggested by Hypothesis 4b.

Table 6–12: Two-group analysis (PCI versus NPCI), selected goodness-of-fit statistics, constrained versus unconstrained model, team level ($N_{\text{PCI}}=39$, $N_{\text{NPCI}}=48$)

Chi-square Test of Model Fit	Unconstrained	Constrained	Difference
Value	519.851*	597.950*	78.099
Degrees of Freedom	300	333	33
<i>P</i> -value	0	0	0
Scaling Correction Factor	0.96	0.967	0.007
Chi-square Contributions from Each Group			
NPCI: $N = 48$	273.52	305.016	31.496
PCI: $N = 39$	246.33	292.935	46.605
CFI	0.837	0.803	.034
TLI	0.814	0.798	.016
RMSEA	0.13	0.135	.005
SRMR	0.17	0.195	.025

6.3 Conclusion

This chapter tested four hypotheses. Following the three-step framework for SEM testing (discussed in Section 5.9.2) and two-step process for mediation test (Flow chart 5-1, discussed in Section 5.9.1), this chapter discussed the baseline model, alternative nested models and identified the best model. This chapter tested the effects from the predictor (X) to Mediator (M), from the Mediator (M) to dependent effect (Y), and from the predictor to dependent variable via mediator (independent (X)→Mediator (M)→dependent effect (Y) in the first step for mediation test, followed by a test of the direct part from the independent (X) to dependent effect (Y) in the second step for mediation test. The results indicated a full mediation model at individual level but partial mediation model at team level. This chapter finds that all the hypotheses (1a, 1b, 1c, 2a, 3a, 3b) testing causality are supported in the same manner at both the individual and team level except for one hypothesis (2b) - PsyCap mediates the relationship between role modelling and work competence partially rather than fully. In addition, by

conducting an independent-samples t-test, this chapter finds an effect of PCI training on supervisor PsyCap (Hypothesis 4a). By conducting a two-group analysis to test for invariance in structural parameters comparing the PCI and NPCI groups, this chapter supports the hypotheses of transmission effect of authentic leadership on employees (Hypothesis 4b).

Chapter 7 Findings and discussions

This chapter summarises findings, and recaps their theoretical backgrounds.

Table 7–1: Summary of hypotheses and findings

	Hypotheses	All samples		Two groups Experimental	
	Baseline model: AL→XRM→XPSY→XLCP→XOCB	Individual N = 620	Team N = 87	Individual N = 300	Individual N = 320
1a	Authentic leadership has time-lagged effects on role modelling.	Supported 0.590***	Supported 0.582***	Supported 0.820***	Supported 0.568***
1b	Role modelling has positive effect on PsyCap.	Supported 0.264***	Supported 0.117*	Supported 0.279***	Supported 0.221***
1c	Role modelling fully mediates the relationship between authentic leadership and PsyCap.	Supported Full mediator 0.156***	Supported Full mediator 0.07 (p = 0.097)	Supported Full mediator 0.228***	Supported Full mediator 0.125***
2a	PsyCap has positive effect on work competence.	Supported 0.736***	Supported 0.505**	Supported 0.769***	Supported 0.681***
2b	PsyCap fully mediates the relationship between role modelling and work competence.	Supported Full mediator 0.194***	Not supported Partial mediator 0.06 (p = 0.073)	Supported Full mediator 0.214***	Supported Full mediator 0.150***
3a	Work competence has positive effect on OCB.	Supported 0.551***	Supported 0.427* (p = 0.032)	Supported 0.591***	Supported 0.518***
3b	Work competence fully mediates the relationship between PsyCap and OCB.	Supported Full mediator 0.455***	Supported Full mediator 0.06 (p = 0.073)	Supported Full mediator 0.455***	Supported Full mediator 0.353***
4a	A supervisor in PCI group will observe increased PsyCap from Time 1 to Time 2, comparing with supervisors in NPCI.			Supported Details see Section 6.3	
4b	Authentic leadership in PCI group has stronger effects on role modelling, PsyCap, work competence, and OCB sequentially from Time 1 to Time 2, comparing with NPCI groups.			Supported Details see Section 6.3	

7.1 Discussion on causal model

Hypotheses 1a, 1b, and 1c investigate whether authentic leadership has a direct effect on PsyCap or influences PsyCap indirectly, with role modelling being the full mediator. This study reveals no direct relationship exists between authentic leadership and PsyCap, and role modelling mediates the relationship between authentic leadership and PsyCap.

Hypotheses 1a, 1b, and 1c are supported at both individual and team levels. For Hypothesis 1a, findings indicated a positive effect from authentic leadership (Time 1) to role modelling (Time 2). Additional evidence from data analysis using individual samples ($N = 300$, $N = 320$) also supported the hypothesis. This justifies the initial theoretical explanation that to detect effects of authentic leadership a time lag is needed, although there is no accepted guidance on choosing the length of the lag (Frese and Zapf 1988; Zapf et al., 1996). Hypothesis 1b refers to a positive relationship between role modelling and follower PsyCap. The coefficient is greater with stronger significance at individual level ($p < 0.001$) than at team level ($p < 0.05$), in line with the claim that larger sample size contributes to the statistical significance level (Wright and Crimp, 2000, p. 374). As anticipated in Hypothesis 1c, the findings confirm an indirect relationship between authentic leadership and PsyCap via role modelling. These findings justify the theoretical application using SLT, emotion contagion theory, and BB theory (discussed in Chapter 4). The findings are consistent with many leadership studies (e.g. Schein, 2004), suggesting that acting as a role model is an embedding mechanism to influence employees. With no role modelling, any impacts could hardly convey from leader to employee. The findings are particularly in line with existing authentic leadership studies, conceptually proposing that authentic leaders serve as a model to develop followers (Avolio, 2003; Avolio et al., 2004; Gardner et al., 2005). However, this study extends the conceptual research by providing the first evidence of authentic leadership affecting employees' PsyCap via role modelling.

Hypotheses 2a and 2b investigate whether role modelling has a direct effect on work competence or influences work competence indirectly, with PsyCap being the full mediator.

Hypothesis 2a is supported at both individual and team levels. Findings support that employees' PsyCap determines their work competence. Additional evidence from data analysis using individual samples ($N = 300$, $N = 320$) also supported the hypothesis. Findings justify the previous discussions in Chapter 4, by using multiple theories (e.g. goal setting, COR, BB). For example, goal setting is the first step in PCI training. According to goal-setting theory and COR, having a challenging, clear goal can broaden PsyCap, which in turn, contribute to build other resources (e.g. work competence).

Hypothesis 2b is supported at individual level. For individual level, this study finds an indirect effect from role modelling to work competence through PsyCap, without direct relationship between role modelling and work competence at individual level. This suggests a full mediation role of PsyCap at individual level according to criteria of mediation assessment (e.g. Baron and Kenny 1986; Kenny et al., 1998; Mathieu and Taylor 2006; Seibert 1982; Seibert et al., 2004) (discussed in Section 5.9.1). This justify the previous discussion in Chapter 4, that PsyCap serves as a driver for employees to learn by, to practice with, and by which their specific work competence can be improved in their daily operations.

Hypothesis 2b is not supported at team level. For team level, this study indicates that role modelling does have an indirect effect on work competence. But in the meantime, findings also reveal that role modelling has a direct effect on work competence ($XRM \rightarrow XLCP$). Therefore, it can be concluded that PsyCap partially mediates the relationship between role modelling and work competence at team level because it meets the requirement in testing a partial mediator based on suggestions by researchers (e.g. Baron and Kenny 1986; Kenny et al., 1998; Mathieu and Taylor 2006; Seibert 1982; Seibert et al., 2004) (discussed in Section 5.9.1).

The relationship between role modelling and work competence has been observed at team level but not at individual level. Possible explanation could be as follows: Role modelling relates to work competence at team level, where it shows a strong size effect, rather than individual level. Authentic leaders set examples for their employees, providing a unified standard. However, the influence from the role model varies. Using SLT (Bandura 1977, 1986) as an example, there are six stages of observational learning (discussed in Section 2.6.1). Characteristics of authentic leaders from observational learning can only be conveyed to employees at later stages, with the emergence of self-efficacy leading to increased PsyCap. Using BB theory (Fredrickson, 1998, 2001; Fredrickson and Cohn, 2008), the extent to which individuals can broaden their resources and build them up (e.g. PsyCap) varies. Therefore, regardless of whether the leader exhibits a different or unified role model for individual followers, the extent of role modelling perceived will vary. Thus, role modelling's effect is more of a group-level effect, because its effects on individuals are too discrete. The group-level phenomenon is supported by considerable research (e.g. Bass et al., 2003; Degroot et al., 2000), for example, a meta-analysis review by DeGroot et al., (2000) report that charismatic leadership is more effective in increasing team performance rather than individual performance. Another alternative explanation could be that this study uses production workers as samples in workplaces in which highly interdependent team-work procedures have been designed, due to the nature of the manufacturing process. As a result, a unified standard defining work competence is likely clearly articulated and encouraged throughout the companies. Authentic leaders likely promote it via their exemplary modelling behaviour among team members, leading to a strong group-level of work competence.

Hypotheses 3a and 3b investigate whether PsyCap has a direct effect on OCB or influences OCB indirectly, with work competence being the mediator. Hypotheses 3a and 3b are supported at both individual and team levels. This study finds no direct relationship between PsyCap and OCB, and work competence fully mediates the relationship between PsyCap and OCB according to criteria of mediation assessment (e.g. Baron and Kenny 1986; Kenny et al., 1998; Mathieu and Taylor 2006; Seibert 1982; Seibert et al., 2004) (discussed in Section 5.9.1).

Hypothesis 3a refers to a positive relationship between work competence and OCB. This finding justifies the previous discussions in Chapter 4, by using BB theory and COR theory. Competent workers are more likely to build more resources for resource conservation given their high work competence provides them capabilities to take extra roles.

In line with the initial Hypothesis 3b, findings indicate an indirect relationship between PsyCap and OCB, fully mediated by work competence. This finding justifies the theoretical application using SET, BB, and COR theories discussed in Chapter 4. For example, good work competence equips employees' capabilities to offer extra help to others (e.g. company, peers). Moreover, driven by SET, it is likely workers intentionally offer help in exchange for future favours or conservation of resource. This finding is consistent with the notion by Wright et al., (2001, p. 706) that OCB cannot be exhibited without required skills.

7.2 Discussion on PCI effects

When testing Hypotheses 1–3, results show that all mediation relationships are greater in the treatment group than control group. Specifically, the indirect path coefficients ($AL \rightarrow XRM \rightarrow XPSY$; $XRM \rightarrow XPSY \rightarrow XLCP$; $XPSY \rightarrow XLCP \rightarrow XOCB$) are .228, .214,

and .455 for the PCI group and .125, .150, and .353 for the NPCI group. This provides preliminary evidence that PCI training amplifies authentic leadership's consequences.

Hypotheses 4a and 4b investigate the effects of PCI training. Hypotheses 4a and 4b are supported. Hypothesis 4a refers to a greater supervisor PsyCap increase is expected in PCI group than NPCI group. The PsyCap difference between the two groups is significant after PCI training; indicate the effect of the PCI training. Supervisors in PCI group observed an increase which is in line with previous PCI studies (e.g. Luthans et al., 2006, 2008b, 2010). But supervisors in NPCI group observed a decrease which has not been found in any of the previous studies. This new finding might provide additional evidence that individual PsyCap is state-like and very dynamic. In this study, the result might indicate that production workers have been experienced negative influence (e.g. consequence of manufacturing crisis). Further, the findings regarding to the greater supervisor PsyCap increase suggest that PCI training enable supervisors in PCI groups combat the negative influence which has caused a general decline in all the measures for NPCI groups. This finding is consistent with previous empirical PsyCap studies (e.g. Avey et al., 2008a; Baron et al., 2013) supporting that using positivity contributes to combat negativity (e.g. stress).

For Hypothesis 4b, all studies at individual and team levels provide evidence supporting this hypothesis. It is expected that authentic leadership on Time 1 will have a greater influence on employees on Time 2 in the PCI group than in the NPCI group. This study finds a significant difference between the two groups, suggesting PCI training produces an effect. Such a difference accounts for PCI training effects. The explanation is that supervisor PCI training probably strengthened the influence of their authentic leadership on their employees' outcomes.

As developing authentic leadership influence via role modelling takes time (time lag), this explains why this study measures authentic leadership on Time 1 but role modelling on Time 2. PCI training likely accelerates the development of the authentic leadership influence on role modelling, or amplifies its effects. As a result, role modelling will be enhanced more quickly and to a greater extent in the treatment group than the control group, resulting in a sequential rise of follower PsyCap, work competence, and OCB.

7.3 Conclusion

This chapter summarized the findings and again justified the initial hypotheses.

Chapter 8 : General conclusions

This chapter pulls together the threads of this study by recapitulating its aims and salient findings. General conclusions are offered, based on a brief but concise review of the research. Strengths and contributions of this work are identified. Based on analysing the limitations, future research directions and career practices are suggested.

8.1 General conclusions

The central aim of this study was to examine the consequences of authentic leadership and PsyCap, and test several mediation effects at both individual and team levels. A further objective was to investigate PCI training effects on the subjective person – the authentic leader – as well as its transmission effect towards his or her subordinates – the working followers. Rich theories – SLT, emotion contagion and BB theory, COR theory, goal setting theory, and SET – were used as the theoretical foundation to propose the hypothetical models.

This study incorporates a longitudinal research instrument using a two-wave complete panel design with a six-week time lag between the waves. Data were collected from multiple resources including production workers, supervisors, and line managers. Procedural techniques were adopted to attract participants and facilitate truthful responses, resulting in an excellent response rate with a large valid sample size ($N = 620$ individuals; $N = 89$ teams). This study used well-established measures with sufficient evidence indicating their high validity in previous publications and provided additional evidence, due to the measurements' excellent reliability and validity.

This study is experimental research, with 39 out of a total of 89 supervisors participating in a 4-hour long PCI training session soon after the first-round survey. A checklist as exercise was distributed to the trainees, as a training enforcement to the follow-up procedure. PsyCap differences between the treatment and control groups were observed.

This study tested the hypotheses using two statistical techniques. Firstly, it used CFA to identify the best measurement model. Alternative measurement models were tested and findings indicated the proposed measurement model was appropriate, due to its excellent goodness-of-fit. Secondly, this study used SEM to test causal hypothesised models. Alternative nested structural models were tested and findings indicated the proposed structural model was an appropriate model at individual level. A better structural model, however, was identified at team level, due to its significant better goodness-of-fit, compared with the hypothesised model. A new causal path from role modelling to work competence was identified, but at team level rather than individual level. Finally, using SEM, a two-step group analysis was conducted comparing the unconstrained and constrained models to test the difference in structural parameters between treatment and control groups. Result indicated significant different effects in the causal paths in the structural models at both individual and team levels, providing strong support of PsyCap intervention effects.

The results from SEM revealed substantial new findings, compared with previous studies. Key findings were that authentic leadership does not directly predict employees' PsyCap but transmits its effect through role modelling. Employees' PsyCap does not contribute to OCB but transmits its main effects through work competence. These findings are more in-depth than corresponding prior studies, for example, PsyCap studies (e.g. Eid et al., 2012; Rego et al.,

2012, Walumbwa et al., 2011) report a positive relationship between authentic leadership and employee PsyCap, without further investigating how the influence happened. Secondly, while employees' PsyCap does not contribute directly to OCB, it does through its effect on work competence. Another new finding is that training leaders' PsyCap affects their role modelling, which in turn influences employees' PsyCap, work competence, and OCB. This finding in particular made the study's contribution unique and significant, as it is the first PCI training study to examine the transmitting effect from team leader to team members. It is also the first study to examine PsyCap's developmental characteristic as well as its behavioural impacts from PCI training in the Chinese context.

8.2 Strengths and limitations

As the first study to examine the consequences of authentic leadership and PsyCap at both individual and unit levels, employing longitudinal and experimental designs, this study makes several important contributions to the literature in POB.

8.2.1 Strengths

A major strength of this study is it employed longitudinal research, with data collected in two rounds from three business organisations, making it possible to reveal causality among the studied variables. Current research on authentic leadership and PsyCap shares a common limitation in that little research has been carried out studying causality (e.g. Eid et al., 2012; Rego et al., 2012, Walumbwa et al., 2011). Previous research used data collected at a single time point; therefore, it is difficult to determine how POB constructs influence one another. However, longitudinal research in this study provided opportunities to examine how an independent variable can affect the dependent variable over time, and thus establish causality between them. Moreover, this study tested the time-lagged effects of authentic leadership, due

to considering that authentic leadership's effects on employees may take some time to materialise; thus this aspect provides unique and fresh insights.

As it is discussed in Section 5.8.5, a good longitudinal research must meet five criteria, in terms of incorporating time lag, using good measure, using SEM (or multiple regressions), checking response rate on two rounds, and using complete panel design (Nesselroade and Baltes, 1979; Taris 2000; Zapf et al., 1996). Although a few PsyCap researchers had tried to examine causality with longitudinal design (e.g. Avey et al., 2010a; Peterson et al., 2011), little study meets the benchmark for a good quality of longitudinal research. However, this study has met all these five criteria, suggesting its good quality in its methodology. For example, this study uses a complete panel design whereby all studied variables were measured in two rounds. It allowed for the testing of time-lagged effects, that is, whether the effect of authentic leadership on Time 1 demands on role modelling on Time 2, and for the testing of synchronous effects, that is, whether the effects on role modelling had synchronous effects on employee PsyCap, work competence, and OCB. Thus, this study has been entitled as a good methodological quality longitudinal research, in this regard.

Another strengths of this study is that the research was conducted not only at individual but also at team levels. Unit-level studies on authentic leadership and PsyCap are very important, because in the workplace, teams working efficiently are more important than individual performances. However, few studies have examined the consequences of authentic leadership and PsyCap at the unit level. Furthermore, within the limited unit-level PsyCap studies, there exists weakness in their data-collecting methods. Firstly, some of them used college students as samples (e.g. Luthans et al., 2007a; Walumbwa et al., 2011; West et al., 2009), but data from

students are not directly comparable to that collected in the workplace. Secondly, for those researchers who collected data from workplaces, their sample sizes are so small that they were not sufficient to reduce the risk of common method bias. For example, the sample size in this study by Clapp-Smith et al., (2009) is only 26 small retail clothing stores consisting of 89 employees. Unlike existing unit-level PsyCap studies using college students or small-size working adults as samples, this study used a relatively large group, 87 teams consisting of 620 production workers.

Further, this is an experimental research study that used RCT to divide the control group and the treatment group who received the PsyCap intervention. There are a few PCI training studies that have been carried out examining the developable characteristics of PsyCap and the resulting outcomes on subjective individuals (e.g. Youssef and Luthans 2007). But only the rare PCI training study was carried out examining the transmission effect of PsyCap intervention. To the best of our knowledge, only one PhD dissertation by Hodges (2010) has explored the effects of PCI training on managers and expected increased PsyCap for managers who received PCI training as well as their subordinates. However, his hypotheses are not supported. He explained that it might be caused by a ceiling effect that when variables already have a high rating which is the case in his study, improving them to a significantly higher level is difficult. Conversely, this study's findings not only answered the question whether supervisor PsyCap is positively associated with subordinates' work competence and OCB, but also further illustrated how to improve employees' work competence and OCB training supervisors' PsyCap. Therefore, this study has produced original insights, in this regard.

Within the limited experimental research that has examined PsyCap intervention, the majority was produced by a single U.S. author, Professor Luthans, and his colleagues (e.g. Luthans et al. 2006, 2007b, 2008b, 2010). To the best of our knowledge, we found only one study by Hodges, 2010 not produced by Luthans et al.; however, it is a PhD dissertation supervised by Luthans. Indeed, we could not find a single publication that was not connected with Luthans. Thus, this study might be the first of its kind, as its setting is in the China context, and it extends existing research by providing additional evidence. It is the first longitudinal and experimental study examining the consequences of authentic leadership and PsyCap in that country. Within the limited experimental research carrying out PsyCap intervention, RCT was rarely reported to have been used in their studies (e.g. Hodges, 2010). RCT is argued to be the most powerful type of experimental methodology, due to its ability to reduce selection bias (Rychetnick et al., 2002; Stolberg et al., 2004). This study incorporated experimental intervention research using RCT in the group allocation, which produced a more rigorous design, compared with previous studies.

Another strengths of this study is its statistical techniques. This study used powerful statistical techniques to examine causality and effects of PsyCap intervention. The notion of using SEM as the criteria to evaluate the longitudinal study's quality is in line with claims by other researchers (e.g. Anderson and Gerbing 1988; Kline, 2005; Podsakoff et al., 2003) who attest to choosing SEM as a powerful analytical tool to test a real cause–effect path (Kline, 2005). This study used SEM to check all alternative models, including direct and indirect relationships, and employed a two-group analytical technique with SEM to test the difference between the PCI training group and the control group. Therefore, the findings on causal models are safe.

Lastly but not leastly, this study used systematic, consistent procedures in conducting the survey throughout the three companies. Evidence gathered from the sound response rate, sample size, reliability, and validity justifying the use of consistent procedural techniques was appropriate. This study selected well-established measurement constructs from publications, but scale improvements were made, based on feedback obtained from the pilot survey. This study introduced incentive schemes, protected respondents' identification, and acquired the commitment of the three companies to make the survey a priority over their normal production schedules. All of these factors taken together contribute to the measurements' reliability and validity.

8.2.2 Limitations

Despite the above-mentioned strengths, this study has limitations.

Although the risk of common method bias was reduced by using the numerous technical methods outlined above, the possibility of common method bias cannot be entirely eliminated. Firstly, the three measures – authentic leadership, role modelling, and PsyCap – were rated by production workers. Self-reported data are related to common method bias which has been discussed in Section 5.8.1. Secondly, although data were collected from multiple raters, including production workers, supervisors, and line managers, the nature of such data is subjective. Therefore, raters might give a positive desirable answer for self-serving purposes – that is, they might: rate themselves more favourably than is accurate; try to please the direct supervisor by offering a favourable rating; or underrate others, due to a personal dislike. In fact, aspects of social desirability cannot be absolutely reduced, as many researchers (e.g. Donaldson and Grant-Vallone, 2002; Podsakoff et al., 2003; Spector, 1987; 1994; Spector and Brannick 1995) claimed, and social desirability bias may inflate inferences about causality, which in turn

can cause common method bias. The absence of archived data in POB studies contributes to the risk of common method bias (Clapp-Smith, et al., 2009; Friedrich et al., 2009; Jensen and Luthans, 2006).

Another limit of this study is regarding to the length of time lag. This study sets a six-week time lag between two data collection rounds. Whether the effect of independent variables (authentic leadership on Time 1) on dependent variables (e.g. role modelling, work competence, and OCB sequentially) had sufficient time to develop is uncertain. Although the result indicates significant time-lagged causal effects (e.g. authentic leadership on Time 1 on role modelling on Time 1), a more suitable length of time lag might exist, leading to a greater effect. However, as suggested by De Lange et al., 2003, no guidelines on a correct length of time lag exists; therefore, more PCI training work is absolutely necessary to determine an appropriate length of time lag.

8.3 Recommendations for future research

Future research should look at the psychometric to ensure construct validity of authentic leadership and PsyCap. As discussed in section 5.5, this study employs well-established and validated scales to measure variables, back-translation, pilot surveys, and modifications with removal of some items. Two measures, role modelling and OCB, out of the five observed variables have been modified according to the feedback of the Chinese production workers. The measure construct of authentic leadership and PsyCap remains original due to some concerns (e.g. copyright issue; availability of alternative measure scales). However, recent research has addressed critiques of the construct and suggestions for improvement. For example, Dawkins, Martin, Scott and Sanderson (2013) suggest that the construct needs refinement after a critical

analysis of PsyCap construct in terms of its conceptualisation and psychometric properties. The same is true for the measure construct of authentic leadership. For example, authentic leadership fulfils being true to themselves with their actions being in accord with their values. Whether the construct of authentic leadership is applicable in more collectivist culture such as China, needs to be further examined.

This study is of the nature of a longitudinal research survey with a complete panel design. Time lag has been considered, but as is suggested by other researchers (e.g. De Lange et al., 2003), how to determine the length of the time lag has not be ascertained definitively. To extend the ambience of the present work, it is suggested that subsequent research (e.g. third and fourth waves) and data collection be investigated to check the result with different time lags (e.g. 6-month or 1-year periods). Results based on subsequent data can be used to calculate the best time lag in PCI training research.

As is the case with most of unit-level PsyCap studies, sample size is the most important challenge. Therefore, team level study with a large sample size from actual workplaces is encouraged. Particularly, with PCI training study at team level, the sample size is of greater concern, because team size will be halved when teams are divided into two groups to form treatment and control groups.

Further, due to concerns that coverage of multiple occupations would engender poor situational comparability, this study is based only on samples from a particular occupational group (production worker), limiting its findings' generalisability to other occupational groups.

Therefore, additional research is needed to test to what extent this study's findings can be applied to other occupational sectors (e.g. salesman).

Although the emerging evidence has illustrated PCI training's impressive effects (e.g. Luthans et al., 2006, 2008b, 2010), the training material's relevance and methods in training delivery vary from one culture to another, and cross-cultural generalisations of PCI training invite additional studies. In particular, as this study is the first one to examine the transmission effect of leader–follower with leaders receiving PsyCap intervention, more evidence is needed to test PsyCap intervention validity.

8.4 Practical implications

As authentic leadership affects employees' PsyCap via the process of role modelling, employees' PsyCap level predicts work competence and in turn OCB, which is associated with organisational performance. As employees' own PsyCap accounts for organisations being able to maintain sustainable competitive advantages that can eventually contribute to organisational success, firms must remain aware of PsyCap's antecedents and consequences. Therefore, the findings in this study may provide guidance for organisations interested in leadership, human resource management, and employee training and development. In addition to offering suggestions for future academic research, this study provides practical implications for organisations' daily management.

This study reveals direct and indirect relationships among the studied variables, and the effects of PCI training, all of which have practical implications. Firstly, organisations should place great emphasis on authentic leadership, as it is the root cause antecedent to all positive

employee outcomes. Secondly, role modelling (e.g. leading by example) should be heavily encouraged inside organisations as authentic leadership effects can only be transmitted via role modelling (which serves as a full mediator) in order to boost employees' positive outcomes. If a leader fails to act as an appropriate example by behaving consistently with her/his stated values, then s/he will lose employees' respect, and the leadership will make no impact on employees. Therefore, an effective manager must be prepared to exhibit role modelling behaviour (e.g. leading by example). Subordinates should be made aware of the advantage of having a role model and remain attentive to the resources authentic leaders bring to the relationship (e.g. positive emotion, PsyCap, skills). Thirdly, organisations should acknowledge that job specific work competence predicts the execution of OCB, not general human capital. Work competence refers to employees' firm-specific human capital in terms of quality, quantity, and efficiency for a particular job – demands that are not easily imitable. This must be distinguished from general human capital (e.g. education, skills, and experience). As it has discussed in Section 2.5, firm-specific human capital (work competence) is a sustained competitive advantage, whereas general human capital is not. To some extent, improving general human capital may cause the risk of losing some workers because employees can take their human capital to alternative organisations when they leave (Campbell et al., 2012); that is, training general human capital accelerates an employee's competence in the job market, which can lead to her/him seeking new career opportunities elsewhere if s/he perceives none exist within the company. As a result, specific work competence should be preferred over general human capital.

Training employees' general human capital and leadership is a very popular practice in contemporary organisations. However, this study provides new evidence for organisations to use in reviewing their training strategies, for example, investigating training options, such as

training employees' general human capital (e.g. education, skills, and experience), determining employees' specific work competencies, identifying candidates for authentic leadership, and establishing PsyCap training for both leaders and employees. This study's findings also indicate that, when considering applying PsyCap training to an employee cohort, specific work competence training should be heavily preferred over general work competence.

According to the findings, PsyCap training for production workers should contribute to improved work competence and enhanced OCB. However, PsyCap training on a large scale of direct production workers (e.g. 620 production workers in this study) involves substantial resources. Findings in this study provide empirical evidence demonstrating that PsyCap training to the leaders not only can increase leaders' PsyCap but also can strengthen authentic leadership's influence over employees, resulting in improved work competence and in turn the exhibition of OCB. It suggests that improving leaders' PsyCap represents a short cut to improving employees' work competence and, in turn, employees' engagement with OCB. Moreover, providing PsyCap training to the majority (employees), compared with offering it to only the minority (leaders), allows for the training to be directed towards a smaller group, which is more cost efficient in terms of both time and money than offer the training to the larger group of employee. In sum, PsyCap training, particular for the supervisor level, may be the best strategy for many organisations to apply.

Moreover, the study reveals a time lag concerning authentic leadership's effects. It provides a practical implication for assessing a training program. When a company is evaluating a leadership training program's effectiveness, both managers and staff should realize the

existence of the time lag of such effectiveness and not rush to conclusions, based on an absence of any immediate effects.

As discussed, this study adopts a six-week time lag between the two rounds of data collection, though short, the results show strong evidence of developmental character of PsyCap and transmitting effect from team leader to team members. This finding provides practical implication in the evaluation of training needs. On one hand, the development of supervisors' PsyCap can lead to the increase of their role modelling, which in turn influences their employees' PsyCap, work competence and OCB. On the other hand, low level of supervisors' PsyCap could have negative impacts on their role modelling, which in turn influence in an unexpected manner. Therefore, PsyCap evaluation could be part of training needs evaluation for both supervisors and production workers. When the level of production workers' PsyCap is low, it might be the signal that the level of supervisors' PsyCap is low. When the level of supervisors' PsyCap is low, immediate actions must be taken to improve their PsyCap.

The study has specific implications to its setting, China. As discussed in Section 5.2, deeply affected by the economic downturn, China's manufacturing sector is facing extreme challenges. On the one hand, companies must pay higher minimum wages for workers but are receiving fewer production orders. On the other hand, they must also acknowledge potential negative consequences for workers who are struggling with their basic living standards' rising costs. Findings in this study offer organisations a solution. By introducing PsyCap training as the primary training mechanism, firms will observe increased positivity helping their employees to combat all negativity. As a result, work competence will improve, and an

exhibition of positive OCB will prevail. Organisations will reap the benefits of positive and successful workplaces.

From the above discussion, we can conclude that authentic leadership boosts employees' PsyCap via role modelling, which in turn predicts consequences, including work competence and OCB in workplaces. PsyCap training for leaders improves their PsyCap and magnifies authentic leadership's effectiveness. The present study suggests that on the organisational level, to retain a sustainable competitive advantage, sponsorship and encouragement should be primarily directed towards authentic leadership, with a focus on role modelling, thus more readily engineering the expected positive consequences. An alternative path is to intervene in leaders' PsyCap, so all consequences resulting from authentic leadership can be amplified. Using this as a goal, organisations may find it prudent to switch their training investment from traditionally increasing an employee's general skills and experience to improving their management team's PsyCap. Given that PsyCap is state-like and developable, investing in and developing organisational leaders PsyCap presents a feasible, cost-effective solution that can certainly strengthen organisations in a variety of ways.

Appendices

Employee questionnaire

Below are statements that describe how you may think about yourself and your leader right now. Circle one number for each item to indicate your level of agreement or disagreement with each statement.

Please answer all the questions-It is important for our research to get your view on each of items.

Employee number: _____(e.g. TA 00101)

Section 1: Yourself

Below are statements that describe how you may think about yourself **right now**. Use the following scale to indicate your level of agreement or disagreement with each statement.

<i>Strongly disagree = 1 to strongly agree = 6</i>						
1) I feel confident analyzing a long-term problem to find a solution.	1	2	3	4	5	6
2) I feel confident representing my work area in meetings with management.	1	2	3	4	5	6
3) I feel confident contributing to discussions about the company's strategy.	1	2	3	4	5	6
4) I feel confident helping to set targets/goals in my work area.	1	2	3	4	5	6
5) I feel confident contacting people outside the company (e.g., suppliers, customers) to discuss problems.	1	2	3	4	5	6
6) I feel confident presenting information to a group of colleagues.	1	2	3	4	5	6
7) If I should find myself in a jam at work, I could think of many ways to get	1	2	3	4	5	6
8) At the present time, I am energetically pursuing my work goals.	1	2	3	4	5	6
9) There are lots of ways around any problem.	1	2	3	4	5	6
10) Right now I see myself as being pretty successful at work.	1	2	3	4	5	6
11) I can think of many ways to reach my current work goals.	1	2	3	4	5	6
12) At this time, I am meeting the work goals that I have set for myself.	1	2	3	4	5	6
13) When I have a setback at work, I have trouble recovering from it, moving	1	2	3	4	5	6
14) I usually manage difficulties one way or another at work.	1	2	3	4	5	6
15) I can be "on my own," so to speak, at work if I have to.	1	2	3	4	5	6
16) I usually take stressful things at work in stride.	1	2	3	4	5	6
17) I can get through difficult times at work because I've experienced	1	2	3	4	5	6
18) I feel I can handle many things at a time at this job.	1	2	3	4	5	6
19) When things are uncertain for me at work, I usually expect the best.	1	2	3	4	5	6
20) If something can go wrong for me work-wise, it will.	1	2	3	4	5	6
21) I always look on the bright side of things regarding my job.	1	2	3	4	5	6
22) I'm optimistic about what will happen to me in the future as it pertains to	1	2	3	4	5	6
23) In this job, things never work out the way I want them to.	1	2	3	4	5	6
24) I approach this job as if "every cloud has a silver lining."	1	2	3	4	5	6

Section 2: Your leader

Looking at the influence that you may have from your supervisor, to what extent do you agree or disagree with each of the following statements?

My leader:

<i>Strongly disagree = 1 to strongly agree = 7</i>	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly Agree
1) Lead by example.	1	2	3	4	5	6	7
2) Sets a positive example for others to follow.	1	2	3	4	5	6	7
3) Exhibits the kind of work ethic and behavior that I try to imitate.	1	2	3	4	5	6	7
4) Act as a role model for me.	1	2	3	4	5	6	7

The statements below are designed to assess certain type of leadership style. Please circle the most appropriate number, indicating the extent to which you agree or disagree with each statement as a description of your leader's leadership style.

My leader:

<i>Strongly disagree = 0 to strongly agree = 4</i>	not at all	Once in a while	Sometimes	Fairly often	frequently, if not always
1) Says exactly what he or she means.	0	1	2	3	4
2) Admits mistakes when they are made.	0	1	2	3	4
3) Encourage everyone to speak their mind.	0	1	2	3	4
4) Tells you the hard truth	0	1	2	3	4
5) Displays emotions exactly in line with feelings.	0	1	2	3	4
6) Demonstrates beliefs that are consistent with actions.	0	1	2	3	4
7) Makes decisions based on his or her core values.	0	1	2	3	4
8) Ask you to take positions that support your core values.	0	1	2	3	4
9) Makes difficult decisions based on high standards of ethical conduct.	0	1	2	3	4
10) Solicits views that challenge his or her deeply held positions.	0	1	2	3	4
11) Analyzes relevant data before coming to a decision	0	1	2	3	4
12) Listens carefully to different points of view before coming to conclusions	0	1	2	3	4
13) Seeks feedback to improve interactions with others.	0	1	2	3	4
14) Accurately describes how others view his or her capabilities	0	1	2	3	4
15) Knows when it is time to reevaluate his or her positions on important issues.	0	1	2	3	4
16) Shows he or she understands how specific actions impact others	0	1	2	3	4

Section 3: Your basic information

Your age: years

Your gender: ☐ Male ☐ Female

Your marital status: ☐ Single ☐ Married ☐ Others (Separated/Divorced/Widowed)

Your education: ☐ primary school graduated ☐ junior high middle school graduated
☐ senior high middle school graduated ☐ college or university or above graduated

Thank you very much for completing the questionnaire!

Supervisor questionnaire

Below are statements that describe how you may think about your subordinate right now. Circle one number for each item to indicate your level of agreement or disagreement with each statement.

Please answer all the questions-It is important for our research to get your view on each of items.

Name of the person evaluated: _____(e.g. Wang Gang)

Below are statements that ask you to evaluate the current work competence of this employee.

<i>Very poor = 1 to very good = 7</i>								
1)	How competently does this individual perform the job?	1	2	3	4	5	6	7
2)	How would you judge the overall quality of this individual's work?	1	2	3	4	5	6	7
3)	How effectively does this individual get their work done?	1	2	3	4	5	6	7

Think about how this employee behaves at work. To what extent do you agree or disagree with each of the following statements?

<i>Strongly disagree = 1 to strongly agree = 7</i>								
1)	Eager to tell outsiders good news about the company and clarify their misunderstandings.	1	2	3	4	5	6	7
2)	Willing to stand up to protect the reputation of the company.	1	2	3	4	5	6	7
3)	Makes constructive suggestions that can improve the operation of the company.	1	2	3	4	5	6	7
4)	Actively attends company meetings.	1	2	3	4	5	6	7
5)	Willing to assist new colleagues to adjust to the work environment.	1	2	3	4	5	6	7
6)	Willing to help colleagues solve work-related problems.	1	2	3	4	5	6	7
7)	Willing to cover work assignments for colleagues when needed.	1	2	3	4	5	6	7
8)	Willing to coordinate and communicate with colleagues.	1	2	3	4	5	6	7
9)	Often speaks ill of the supervisor or colleagues behind their backs.	1	2	3	4	5	6	7
10)	Uses illicit tactics to seek personal influence and gain with harmful effect on interpersonal harmony in the organization.	1	2	3	4	5	6	7
11)	Uses position power to pursue selfish personal gain.	1	2	3	4	5	6	7
12)	Takes credits, avoids blames, and fights fiercely for personal gain.	1	2	3	4	5	6	7
13)	Often arrives early and starts to work immediately.	1	2	3	4	5	6	7
14)	Takes one's job seriously and rarely makes mistakes.	1	2	3	4	5	6	7
15)	Complies with company rules and procedures even when nobody watches and no evidence can be traced.	1	2	3	4	5	6	7
16)	Does not mind taking on new or challenging assignments.	1	2	3	4	5	6	7
17)	Tries hard to self-study to increase the quality of work outputs.	1	2	3	4	5	6	7

Thank you very much for completing the questionnaire!

Line manager questionnaire

Below are statements that describe how you may think about the following team right now.

Circle one number for each item to indicate your level of agreement or disagreement with each statement.

Please answer all the questions-It is important for our research to get your view on each of items.

Name of the team evaluated: _____ **(e.g. Ballast testing group)**

Below are statements that ask you to evaluate the current work competence of this team. Circle one number for each item to answer the question.

This team:

<i>Very poor = 1 to very good = 7</i>								
1) How competently does this team perform the job?		1	2	3	4	5	6	7
2) How would you judge the overall quality of this team's work?		1	2	3	4	5	6	7
3) How effectively does this team get their work done?		1	2	3	4	5	6	7

Think about how this team behaves at work. To what extent do you agree or disagree with each of the following statements?

This team:

<i>Strongly disagree = 1 to strongly agree = 7</i>								
18) Eager to tell outsiders good news about the company and clarify their misunderstandings.		1	2	3	4	5	6	7
19) Willing to stand up to protect the reputation of the company.		1	2	3	4	5	6	7
20) Makes constructive suggestions that can improve the operation of the company.		1	2	3	4	5	6	7
21) Actively attends company meetings.		1	2	3	4	5	6	7
22) Willing to assist new colleagues to adjust to the work environment.		1	2	3	4	5	6	7
23) Willing to help colleagues solve work-related problems.		1	2	3	4	5	6	7
24) Willing to cover work assignments for colleagues when needed.		1	2	3	4	5	6	7
25) Willing to coordinate and communicate with colleagues.		1	2	3	4	5	6	7
26) Often speaks ill of the supervisor or colleagues behind their backs.		1	2	3	4	5	6	7
27) Uses illicit tactics to seek personal influence and gain with harmful effect on interpersonal harmony in the organization.		1	2	3	4	5	6	7
28) Uses position power to pursue selfish personal gain.		1	2	3	4	5	6	7
29) Takes credits, avoids blames, and fights fiercely for personal gain.		1	2	3	4	5	6	7
30) Often arrives early and starts to work immediately.		1	2	3	4	5	6	7
31) Takes one's job seriously and rarely makes mistakes.		1	2	3	4	5	6	7
32) Complies with company rules and procedures even when nobody watches and no evidence can be traced.		1	2	3	4	5	6	7
33) Does not mind taking on new or challenging assignments.		1	2	3	4	5	6	7
34) Tries hard to self-study to increase the quality of work outputs.		1	2	3	4	5	6	7

Thank you very much for completing the questionnaire!

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